THE NEWSWEEKLY OF INFORMATION SYSTEMS MANAGEMENT
December 3, 1990 · Vol. XXIV · No. 49 · 136 Pages · $2/Copy · $48/Year

COMPUTERWORLD

HUD set to outsource IS

$526M deal includes new data center, networks

BY GARY H. ANTHES
CW STAFF

WASHINGTON, D.C. — In one of the largest outsourcing deals ever, the U.S. Department of Housing and Urban Development agreed last week to pay Martin Marietta Corp. $526 million to update and operate its information systems for 12 years.

"Our business is running housing assistance programs, not owning and operating computer systems," said HUD deputy secretary Alfred A. DelliBovi. "People should do what they're good at."

HUD has contracted with Bethesda, Md.-based Martin Marietta to do the following:

- Set up a new data center based on Unisys Corp. and Hitachi Data Systems Corp. mainframes.
- Establish a nationwide data communications backbone linking the data center with HUD headquarters and 81 field offices.
- Replace all of HUD's local-area network equipment and personal computers. Some 50,000 PCs are to be installed during the life of the 12-year contract.

Martin Marietta will not replace or enhance its applications software but will gradually move the applications to the new data center from HUD's two existing mainframe centers, which will then be closed. The data center's equipment will then be sold

Continued on page 119

Industry tally

Overall IS budget growth will slow from 6.9% this year, but the impact through the different industries varies greatly with computer equipment on the high end and aerospace at the other

Projected 1991 IS budget growth by industry	
Overall	**5.3%**
Aerospace	(3.0%)
Airlines	8.1%
Autos/Heavy equipment	6.5%
Banks/Financial services	2.2%
Computers/Electronics/ Software	10.5%
Consumer products	8.8%
Media and entertainment	(0.9%)
Oil and energy	5.9%
Pharmaceuticals/ Health products	8.5%
Telecommunications	8.4%
Transportation/ Freight services	1.3%
Utilities	5.4%

Source: Index Group, Inc.

Recession fears trim '91 budget growth

BY JOANIE M. WEXLER
CW STAFF

CAMBRIDGE, Mass. — Growth in corporate information systems budgets is slowing, according to an Index Group, Inc. survey to be released this week. While technology expenditures are expected to increase in 1991 despite general economic predictions of a recession, the growth margin will reportedly be the industry's weakest in three years.

In a report describing a survey of 394 North American IS executives, Index Group concluded that 1991 IS budget growth will drop from a 7.5% average increase in 1988 to a 5.3% predicted increase next year.

"The one thing a recession is going to do is spur a need for businesses to re-engineer themselves," said Robert Reck, an Index Group vice president. "If you're told you have to cut costs by 20% for the company to keep its earnings per share on the mark, you need to fundamentally change how you're operating the business."

Be careful out there

Users agreed that caution is the budget watchword for 1991. "It's certainly going to be a tougher year for getting capital money," said Jim Matsey, corporate director of IS at Reynolds Metals Co. in Richmond, Va. Matsey said Reynolds' 1991 budget is slightly higher than last year's and that while there has been no official cutting back on

Continued on page 6

Heschel quits after 7-month stint at SPAC

BY CLINTON WILDER
CW STAFF

LOS ANGELES — One of the year's most prominent IS executive hirings abruptly turned sour last month when Michael S. Heschel resigned as chairman and chief executive officer of Security Pacific Automation Corp. after seven months.

Heschel *departed suddenly*

Heschel, who was lured from the top information systems post at Deerfield, Ill.-based Baxter International, Inc. last April, was tight-lipped about any disagreements that occurred. "It wasn't like I designed a new system that blew up," he said last week.

Continued on page 6

IBM easing corporate discount terms

BY ROSEMARY HAMILTON
CW STAFF

IBM is increasingly offering discounts to customers based on the dollars they agree to spend rather than a commitment to specific products. This so-called revenue-based discounting allows a customer to change acquisition plans during a contract period without losing the discount, as was often the case with product-related contracts.

The company is apparently taking various approaches in delivering these deals. IBM has officially announced one deal for air-cooled mainframes, confirmed another for high-end mainframes that was never publicly released and denied the existence of a third revenue-based plan that information systems executives said covers corporatewide purchases.

The revenue-based plans, however, all share a common theme: They allow customers to juggle their purchases during a given contract period and maintain their discounts as long as they stick to their revenue commitments. Previously, customers typically agreed to a specific number of product purchases and lost their discounts if they did not follow through on the actual product commitment.

Three IS executives contacted last week said IBM plans to provide what they call an enterprisewide agreement, which is a revenue-based plan for corporatewide purchases. These deals are more far-reaching than what had previously been offered, the executives said. In addition to being based on financial commitments, the discounts also span

Continued on page 120

Microsoft lines up big guns for multimedia product push

BY JAMES DALY
CW STAFF

SAN JOSE, Calif. — Microsoft Corp. attempted to jump start the struggling multimedia market in the DOS world last week with the announcement of a set of hardware and software development specifications as well as multimedia extensions for both Windows and OS/2. The move was supported by IBM, Tandy Corp., AT&T and several other industry heavyweights.

However, some observers said the link between multimedia — the blending of audio, video and animation into traditional data presentations in an interactive manner — and the needs of the average computer user remains elusive.

"There is still a lot of convincing that needs to be done," said Michael French, a senior consultant at Inteco Corp., a market research firm in Norwalk, Conn. "The market potential is there, but there is not one thing that will go boom and suddenly the market will magically appear."

Potential users said the "must-have" application that would cost-justify the hardware upgrade needed for multimedia simply does not exist.

"Technology for technology's sake is becoming increasingly hard to justify in this economic climate," said Nancy Newell, a manager at

Continued on page 8

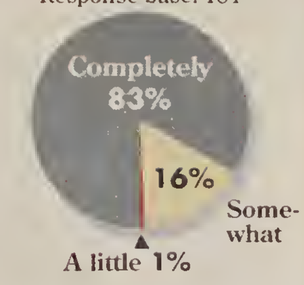
INSIDE

COMPUTERWORLD BUYERS' SCORECARD

Happy T1 users

How well do T1 multiplexers meet your business needs?

Response base: 184



Includes: Stratacom's IPX, NET's IDNX, Newbridge Network Corp.'s Mainstreet 3600, Timeplex, Inc.'s Link

For detailed product ratings, see Buyers' Scorecard page 82

Hewlett-Packard to pump up mini lines with upgrades to the 3000 and 9000 series. Page 4.

Technology Analysis: Lotus' Magellan 2.0 is still a strong text searcher, but new utilities rate below par. Page 55.

NEWSPAPER

IN THIS ISSUE

NEWS

4 In the wake of its CASE rollout, **HP** is launching five new minis, as well as a New Wave extension.

6 The collegiate world is not so different from the business world — both need technology to cut costs.

7 Tandy amicably parts with longtime OEM partner 3Com, looking to Novell as a replacement.

8 Apple has underestimated the appeal of its **Macintosh Classic**: The wiped-out supply will not be replaced until late March.

10 Allied gives the green signal to its **Autolite** division to switch from IBM's platform to a SQL-based RDBMS.

12 Found guilty in a lawsuit filed by rival Cambex involving its IBM 3080 memory product line, **EMC** says it plans to appeal the verdict.

14 Computer Associates is charging a former CA executive, who recently started his own company, with actively soliciting current employees.

119 Bankamerica moves its Asian data center to London as part of a consolidation effort.

121 The defense systems unit of **Unisys** ventures into lucrative new territory with what is probably its first commercial project.

Quotable

"If Machiavelli were alive today, the prince would be a CIO."

ROBERT HETERICK
VIRGINIA TECH

On the need for a central IS figure on campuses.
See story page 6.

SYSTEMS & SOFTWARE

25 An IS manager updates the **U.S. House**'s ancient computer technology, looking to honest Abe as her communications mentor.

27 The banking industry is pleased with Decbank, **DEC**'s latest family of software and services for its fastest-growing market.

PCs & WORKSTATIONS

51 High-end **optical scanners** are not the only ones sprouting improvements — desktop scanners can now play with the big boys in terms of high-end features.

NETWORKING

63 A bank divided against itself: A **Manufacturers Hanover** group is connecting users to both IBM AS/400s and DEC machines.

MANAGER'S JOURNAL

69 To outsource or not to outsource: That is one question dealt with by four firms wanting to stay on the razor's edge of technology.

COMPUTER INDUSTRY

97 The **Rocky Mountain Adoption Exchange** is using Prime computers to match hard-to-place children with families.

PRODUCT SPOTLIGHT

77 When it comes to fractional T1, all multiplexers are not created equal.

IN DEPTH

93 Women under glass: More women are entering computing, but few are making it to the top. By Maryfran Johnson.

DEPARTMENTS

8, 120 News Shorts
18 Advanced Technology
22 Editorial
72 Book Review
76 Calendar
104 Computer Careers
112 Marketplace
116 Training
118 Stocks
122 Trends

The 5th Wave

IN A DISPLAY OF PERVERSE BRILLIANCE, CARL THE REPAIRMAN MISTAKES A ROOM HUMIDIFIER FOR A MID-RANGE COMPUTER BUT MANAGES TO TIE IT INTO THE NETWORK ANYWAY.

EXECUTIVE BRIEFING

■ **Leaner times lie ahead for information systems budgets.** An Index Group survey of 394 IS executives said 1991 budgets will increase by the lowest percentage in three years. Cost-cutting is the watchword, with data center consolidations and outsourcing the most popular methods. However, the recession also represents an opportunity for IS to take the lead in re-engineering business practices to improve the bottom line. **Page 1.**

■ **Michael Heschel resigned as head of Security Pacific Automation** just seven months after his much-publicized hiring. The former IS chief at Baxter called his surprise departure "just one of those things that didn't work out." Security Pacific Vice Chairman John Singleton, Heschel's former boss, will take over his duties on an interim basis while a replacement search proceeds. **Page 1.**

■ **The venerable Sabre airline reservations system** will be broken up and run on smaller platforms. Using the newest version of IBM's transaction processing system, American Airlines will subdivide the huge Sabre database to run on several application-specific platforms. **Page 4.**

Bankamerica will close its Hong Kong data center as part of a move to consolidate overseas processing. The bank says the moves will pay for themselves in two to three years. **Page 119.**

■ **The Autolite Spark Plug Division** will leave the IBM nest of parent Allied and use a Sequent-based Oracle manufacturing resource planning system instead. Allied's other automotive divisions plan to migrate from an IBM 4381 to Application System/400s, but Autolite chose its own path for better integration with its Oracle shop-floor system. **Page 10.**

■ **Choosing the right path among outsourcing,** systems integration or in-house talent is a tricky business. It requires knowing your company's business, what role technology plays and a large amount of old-fashioned soul-searching. **Page 69.**

■ **A regional Prime Computer user organization** was the driving force in the automation of an adoption resource center in Denver. The group convinced Prime to donate computer equipment to the center. **Page 97.**

■ **University IS holds its own unique challenges** for professionals, including lack of hardware and software standardization as well as a shortage of technical support. **Page 104.**

■ ***Computerworld* honored the best and the brightest** — the Top 10 most effective users of IS — at the *Premier 100* awards dinner. **Photo, page 69.**

■ **More women work in computing today** than a decade ago. According to the U.S. Department of Labor, some 245,000 women took IS jobs in the 1980s. But most took lower-level positions that paid 30% less than they paid males, and percentage growth remained flat. Still, many are hopeful about the new decade. **Page 93.**

■ **Network management users say graphical user interfaces** could help deal with the flood of messages coming in from the network. Icons and lines representing network elements may help simplify the network manager's job. **Page 63.**

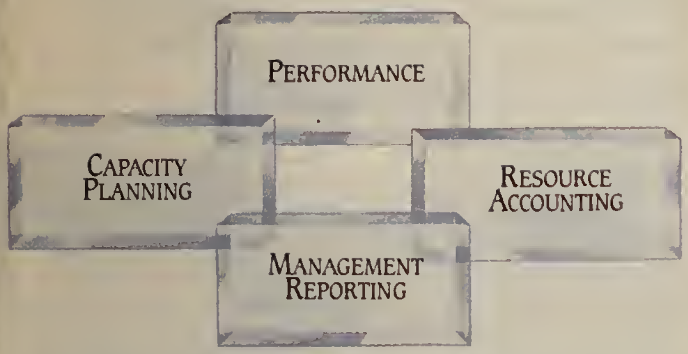
■ **On-site this week:** Manufacturers Hanover hopes to make the most of its computer resources by giving users access to both Digital Equipment Corp. VAXs and IBM AS/400s. **Page 63.** The November elections gave voters a chance to change the look of the U.S. House; now the House's IS group is giving the legislative body's computers a new look. **Page 25.** A Wang minicomputer is helping New York authorities in their bid to battle juvenile delinquency. **Page 28.**

How To Turn Your Data Center Into A Profit Center. Automatically.

Performance.

It's one of the toughest issues data center managers face in the 90s. How can they possibly define, deliver and manage the higher service levels organizations need to compete?

The answer is CA-UNIPACK®/PMA.



CA-UNIPACK/PMA is the most comprehensive and productive performance management and accounting solution ever developed.

CA-UNIPACK/PMA's Performance management facilities provide comprehensive online performance monitoring and historical reporting. Expert system technology is used to enhance and perfect performance analysis.

CA-UNIPACK/PMA includes the most widely used resource accounting and chargeback facilities in the industry. It offers you consolidated reporting and accurate, timely invoicing.

The Capacity Planning facilities utilize advanced analytic modeling. It summarizes and aggregates all performance data and then applies expert system technology. This guides configuration strategy best suited for the installation.

CA90s

CA's Computing Architecture For The 90s protects and enhances the value of every CA software solution.

And now, with our Computing Architecture For The 90s, CA-UNIPACK/PMA can deliver even higher levels of integration and provide total data center automation by working seamlessly with other CA-UNIPACKS that automate Production, Storage, Security, and Data Center Administration.

To find out how CA-UNIPACK/PMA can help you improve service levels and your company's bottom line, call 1-800-645-3003.

COMPUTER® ASSOCIATES
Software superior by design.

© 1990 Computer Associates International, Inc.,
711 Stewart Avenue, Garden City, NY 11530-4787.

HP launches minis, New Wave Access

BY J. A. SAVAGE
CW STAFF

PALO ALTO, Calif. — Hewlett-Packard Co. is set to announce five minicomputers tomorrow for both its Unix and proprietary operating systems and an extension of the company's New Wave Office application. This comes on top of a spate of computer-aided software engineering (CASE) products for commercial systems announced last week.

Two minicomputers in HP's proprietary operating system line, the Series 3000, will fill out the series between the current Models 932 and 955. The new models will run at between 15 million instructions per second (MIPS) and 22 MIPS. Two Unix-based minicomputers will be added to the midrange of the 9000 series and will also run at between 15 MIPS and 22 MIPS. The last Unix-based minicomputer will be at the high end, more than 50 MIPS, according to analysts.

Some analysts, including Carolyn Griffin at International Data Corp. in Framingham, Mass., said HP is changing its marketing to emphasize its minicomputers for commercial transaction processing.

Packaging for the Series 3000 will also change to allow for easier upgrades.

Instead of having to swap boxes three times between the low end of the multiuser models and the high end, users will only have to swap between the high end and the low end. According to analysts, this will be accomplished with the new minicomputers that are built to bridge the upgrade gap between low-, middle- and high-end boxes to make it just low- and high-end boxes with board swaps in-between.

Wave of the future

A software application, called New Wave Access, will also be announced. The product, according to Michael Goulde, vice president of Open Systems Advisors, Inc. in Boston, allows a New Wave-based system (a personal computer-based application holding many functions under one graphical user interface) to link with several different relational databases.

HP would not provide details on the rollout at press time.

Last week, HP announced more products in its Casedge strategy to allow software development and maintenance in heterogeneous environments.

> "IT'S NOT terribly unlike Digital Equipment Corp.'s strategy."
>
> MICHAEL GOULDE
> OPEN SYSTEMS ADVISORS

Three packages that allow CASE development in a client/server environment for use with mainframes, client/server systems and PCs will be available in 1991. The products are part of a strategy to let users develop software in HP's proprietary or Unix environment and apply it to these different computing environments.

"The idea of Casedge is to separate the development environment from the target environment," according to Korak Mitra, product line manager for CASE at HP. Some of these products have been available on Unix-based workstations. Mitra said that by the end of next year, the products will be available across both the Series 9000 and Series 3000 computers.

"They're looking to provide [IBM] AD/Cycle-like functionality in a CASE environment," Goulde said. "And it's not terribly unlike Digital Equipment Corp.'s strategy — to develop CASE for multiple target platforms. That's valuable in today's environment."

The products, ported to HP's operating systems by third-party vendors, are Paclan/C, a multiuser Unix repository from CGI Systems, Inc. in France "that is client/server in nature but generates code for other machines," Mitra said. Similar CASE tools scheduled to be available next year include Maestro II from Softlab, Inc. in Germany and Powercase from Cognos Corp. in Burlington, Mass.

Slivers of Sabre will simplify, speed systems

BY JEAN S. BOZMAN
CW STAFF

TULSA, Okla. — American Airlines' Sabre, the largest airline reservations system in the world, is about to be subdivided. Sabre will be broken into multiple application-specific processors to simplify computer operations — and to speed development of new software systems.

"We need to solve the problem of the monolithic database, or having all your eggs in one basket," said Roy Smyth, managing director of Sabre Engineering here. "We are going toward having different functional processors for different applications."

American has wanted to break Sabre's central complex into smaller pieces for some time. However, Sabre's custom version of the IBM Airline Control Program (ACP), which had been running for 18 years, prevented such a move. ACP required the IBM 3090 processors to operate as a single unit to achieve real-time synchronization.

In March, Sabre converted to Transaction Processing Facility (TPF) 3.1, the latest version of IBM's transaction-oriented system, which supports multiple functional processors. Breaking up Sabre will, however, require additional software development that matches CPU activity to database updates on selected disks.

"The focus we are trying to take is that of the user's perspective," said Thomas J. Kiernan, president of American's Sabre Computer Services Division in Dallas. "We have to figure out a way to make the system available around the world, 24 hours a day, seven days a week, and that's a focus we didn't have three to four years ago."

Just last month, Sabre signed an agreement with Amadeus, a consortium of several European airlines, which may link up with Sabre in a future global reservations network.

Downtime is a key concern, demonstrated most dramatically in May 1989, when a software failure forced Sabre to go off-line for 13 hours. Sabre's systems software gets turned off once per week, for 10 to 12 minutes of scheduled maintenance. That is down from 10 minutes per day three years ago. Unscheduled systems maintenance sometimes forces Sabre operators to take the system off-line for several minutes, causing concern among travel agents and bogging down airport operations.

Stan Wolenski

Kiernan: *Sabre needs to be available around the world*

In the future, IBM's new Escon fiber-optic channels for the Enterprise System/9000 mainframes will help support larger complexes running TPF, even if those TPF complexes are broken down into smaller, more manageable clusters. Moving to multiple TPF systems — and possibly to some future MVS and Unix systems — will give Sabre greater operational flexibility.

According to Kiernan, it will also speed the development of new software applications and travel "products" for travel agents. "We need to carve applications out of the Sabre monolith and carve out the necessary piece of the database, too," he said. That would mean segregating hundreds of Sabre's 1,380 disk drives into database groups.

The appearance of multiple TPF complexes — American's Flight Operations System was stripped from the main complex earlier this year — is new to American. But competitor Covia, United Airlines' reservations system, has had multiple-functional processors for more than two years.

A dual Sabre data center is not in the cards immediately, executives said. "Right now, our data distribution plan is to separate the database logically, not geographically," Kiernan said.

That stance could change by 1993, when AAnet, a digital backbone network with a bandwidth of 45M bit/sec., is scheduled to be completed. AAnet will link American Airlines' core data and aircraft maintenance operations here and with American's headquarters in Dallas/Fort Worth.

George Maulsby, managing director of reliability management, said, "When AAnet becomes fully operational, the only thing you'll need to do to access a Sabre database is to create a new communications connection."

CORRECTION:

A story on personal computer graphics standards efforts [CW, Nov. 19] incorrectly referred to Texas Instruments, Inc.'s Graphics Architecture as Graphics Array.

A hard bits item on Sentinel Computer Services [CW, Nov. 19] should have indicated that the company is now providing on-site technical reconditioning support for water-cooled IBM systems.

COMPUTERWORLD

Editor in Chief
Bill Laberis
Executive Editor
Paul Gillin
News Editor
Peter Bartolik
Assistant News Editor
James Connolly
Senior Editors
Clinton Wilder, Management
Elisabeth Horwitt, Networking
Patricia Keefe, PCs & Workstations
Michael Alexander, Advanced Technology
Rosemary Hamilton, Systems & Software
Nell Margolis, Industry
Maryfran Johnson, Systems & Software
Senior Writers
Joanie M. Wexler
Richard Pastore
Staff Writers
Sally Cusack
Carol Hildebrand
New Products Writer
Gary Byrne
Research Coordinator
Kevin Burden
Features Editors
Glenn Rifkin
Joanne Kelleher
Senior Editors
Michael L. Sullivan-Trainor
Joseph Maglitta
Lory Zottola
Mary Grover Brandel
Donald St. John
Senior Writer
Alan J. Ryan
Associate Editor
Cathleen A. Duffy
Researchers
Jodie Naze
Kim Nash
intern
Derek Slater
Chief Copy Editor
Joyce Chutchian
Assistant Chief Copy Editor
Catherine Gagnon
Features Copy Editor
Kimberlee A. Smith
Copy Editors
Christopher Lindquist
Alice Lesch Kelly
Kelly E. Dwyer
Steven J. Condon
Design Director
Nancy Kowal
Graphics Designer
Tom Monahan
Graphics Specialist
Paul Mock
Design Assistant
Marie J. Haines
Assistant to the Editor in Chief
Linda Gorgone
Editorial Assistants
Lorraine Witzell
Stefanie McCann
Connie Brown
Rights and Permissions Manager
Sharon Bryant
Back issues
Margaret McIndoe
News Bureaus
Mid-Atlantic
201/967-1350
Johanna Ambrosio, Senior Correspondent
Washington, D.C.
Mitch Betts, National Correspondent
202/347-6718
Gary H. Anthes, Senior Correspondent
202/347-0134
West Coast
415/347-0555
Jean Bozman, Senior West Coast Editor
J.A. Savage, Senior Correspondent
James Daly, Senior Correspondent
Jim Nash, Correspondent
Maura J. Harrington, Correspondent
Marilyn Scott, Editorial Assistant
Midwest
708/827-4433
Ellis Booker, Bureau Chief
Michael Fitzgerald, Correspondent
IDG News Service
Penny Winn, Director
Main Editorial Office
Box 9171, 375 Cochituate Road
Framingham, MA 01701-9171
508/879-0700
Fax: 508/875-8931
MCI Mail: COMPUTERWORLD
Subscriptions: 800/669-1002

Catching Up To Lower Cost Computing

Oracle database software lets businesses take advantage of each new generation of low cost computing.

Whatever types of computer a business buys today, there's sure to be something significantly better and cheaper tomorrow.

Yet companies continue to sink money into software that runs on only one kind of computer. Locking themselves out of newer, more cost-efficient computers.

This trap is avoidable for most companies. All they need is the right software. Software that works with virtually every computer and network. Present or future.

Oracle has become the world's largest database software company by providing just that. Software that runs on virtually every type of mainframe, minicomputer, workstation and PC.

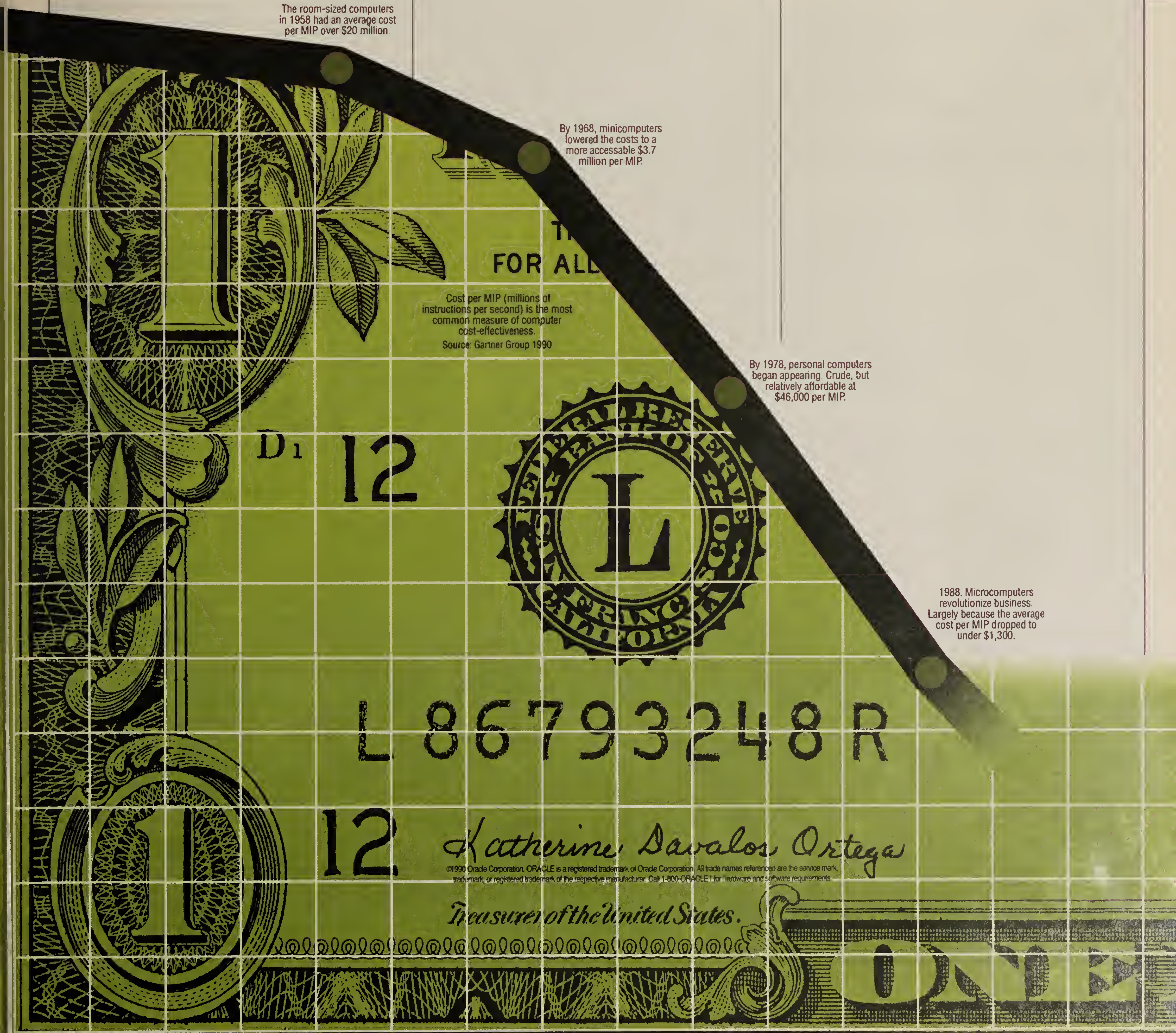
And every time a newer, faster, more cost efficient computer has come along, Oracle has provided the database software not only to run on it, but allow it to share data with existing computers as well.

Call 1-800-633-1071 Ext. 8113 for more information.

Fortunately, you no longer have to predict the future to take advantage of it.

ORACLE®

Software that runs on all your computers.



The room-sized computers in 1958 had an average cost per MIP over $20 million.

By 1968, minicomputers lowered the costs to a more accessable $3.7 million per MIP.

Cost per MIP (millions of instructions per second) is the most common measure of computer cost-effectiveness.
Source: Gartner Group 1990

By 1978, personal computers began appearing. Crude, but relatively affordable at $46,000 per MIP.

1988. Microcomputers revolutionize business. Largely because the average cost per MIP dropped to under $1,300.

©1990 Oracle Corporation. ORACLE is a registered trademark of Oracle Corporation. All trade names referenced are the service mark, trademark, or registered trademark of the respective manufacturer. Call 1-800-ORACLE1 for hardware and software requirements.

Recession

FROM PAGE 1

procurements or staff, the company is re-examining project priorities.

"Projects that are central to improving the business will get the go-ahead," he said, "while others will be put on hold."

Reck said the study revealed an overall "cost-cutting morale" in IS, instigated by both the threat of war in the Middle East and industry-specific factors.

For example, he said, two-thirds of existing pharmaceuticals patents will expire during the next five years, so companies in that industry are already in a ramp-up mode for flattening business — although IS managers are frustrated by business managers "who don't appreciate the value technology can offer."

Major cost-cutting measures IS departments are taking include varying degrees of outsourcing (36%) and consolidating data centers (47%).

Of the 36% of the respondents who are outsourcers, the most popular forms include turning over applications development (45%), personal computer procurement and training (42%) and telecommunications and networking (30%) to a third party, according to the report.

Outsourcing is a method for firms to focus on their core businesses, the report stated, rather than getting distracted by computing and networking activities.

Reck also said the survey results revealed "a naivete on the part of business managers about the role technology is playing in business."

Education the key

He advised IS managers to strive to educate executive management on appropriate technology investments during a recessionary period and to form a "partnership" with them to counteract the problem.

One instance where such a partnership is taking place is at Spencer Gifts, Inc. [CW, Nov. 26] in Pleasantville, N.J. Chief Executive Officer John Hacala views IS on a par with operations, site selection and other strategic facets of the business. He recently got involved hands-on with Vice President of IS Eugene Murtha to design the Spencer Integrated Retail Information System, a database that will fundamentally reshape the way the company does business.

Other users said they are trying to leverage their vendor relationships in anticipation of recession.

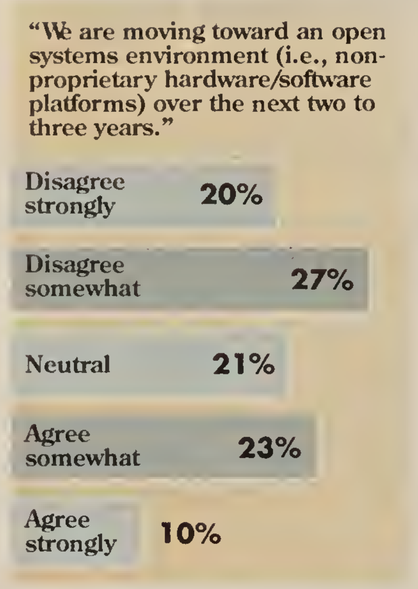
Tom Loane, vice president of computers and communications at Alamo Rent-A-Car in Fort Lauderdale, Fla., said he is surprised that the Mideast crisis has not translated into any downturn in leisure car rentals. He acknowledged, however, that he has "a fear in the back of his head that things could go south." As a result, he said, he is trying to negotiate vendor contracts that allow him to back out "without too much pain."

Another rampant cost-cutting measure is data center consolidation. Index Group estimated that companies consistently reap 25% to 33% savings as a direct result of data center consolidation (see chart), through improved price/performance ratios of information technologies, reduced equipment space requirements and "lights out" (unattended) data center operations.

Senior editor Rosemary Hamilton contributed to this report.

The move is on

The open systems movement has swept up a third of surveyed IS executives

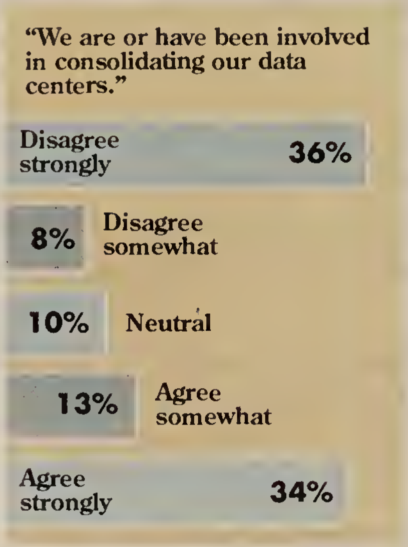


Percent of respondents (base: 394)

Source: Index Group, Inc. CW Chart: Marie Haines

Squeezing out efficiencies

Most of the IS executives surveyed either have been deeply involved in data center consolidation or have done nothing



Percent of respondents (base: 394)

Source: Index Group, Inc. CW Chart: Marie Haines

Colleges learn lessons on using IS to cut costs

BY MICHAEL ALEXANDER
CW STAFF

MIAMI BEACH — Higher education must practice more of what it has been preaching in its business schools: Colleges and universities must rely more on information technology to cut costs, boost productivity and become more entrepreneurial.

That was the primary lesson hammered on in session after session at the College and University Systems Exchange Conference held here last week.

Colleges and universities are feeling the same sorts of economic and societal pressures that have plagued businesses in recent years, according to users who attended the conference.

The cost of providing higher education is soaring, while at the same time, students and parents are questioning whether they are getting their money's worth from increasing tuitions, said Robert Heterick Jr., vice president for information systems at Virginia Polytechnic Institute and State University. "The gap between higher education and society's willingness to pay has never been wider," he said.

Recruiting overseas

A slumping student enrollment — declining in recent years at an annual rate of 14%, by some estimates — has caused many institutions to lose market share or shift their recruitment efforts overseas, speakers said.

As in the business world, information technology is being touted as the strategic weapon to help institutions of higher education compete successfully.

Campus computer systems are also starting the transformation from centralized to distributed systems that businesses are undergoing and grappling with issues the change entails.

Learning institutions typically have a wide assortment of computer systems on campus, and hooking them together and supporting a campuswide network will be one of an IS manager's most daunting and costly challenges during the next 10 years.

One option that merits consideration is outsourcing at least part of the IS function, some speakers said.

"We have looked at it very, very hard and continue to look at it," said Lewis Tameres, chief information officer at the University of Miami. "We are currently evaluating our whole telecommunications network maintenance for outsourcing."

Is a 'computer prince' necessary?

The campus computer user community is extremely diverse; getting this pluralistic user base to hook into a campuswide network and networks beyond takes considerable management skills. It seems like a perfect job for a chief information officer, right? Well, maybe.

"If Machiavelli were alive today, the prince would be a CIO," said Robert Heterick, vice president for information systems at Virginia Polytechnic Institute and State University. There is too much diversity on campuses for a central authority or "computer czar," he said.

The trend toward client/server architectures and away from integrating administrative and academic systems means there is little need for a CIO, he said.

"Contrary to popular belief, I ain't dead," quipped Lewis Temares, CIO at the University of Miami. As campuses rely more on information technology, the CIO will play an increasing role in executive decision-making, he said.

A recent College and University Systems Exchange newsletter noted that university search committees are increasing their efforts to find CIOs. State universities of California, Pennsylvania, Minnesota, Tennessee and Wisconsin are all currently looking to fill a CIO post, the newsletter reported.

MICHAEL ALEXANDER

Heschel

FROM PAGE 1

"Sometimes you don't always fit as perfectly as you'd like. I don't want to get into it any further than that."

Heschel's departure was effective Nov. 15. Former SPAC Chairman John P. Singleton, now vice chairman of parent Security Pacific Corp., will assume Heschel's duties on an interim basis until a replacement is found.

Singleton, to whom Heschel reported, was traveling last week and was unavailable for comment. A Security Pacific spokeswoman said Heschel "resigned to pursue other business opportunities," although an industry source said that was not the reason he left.

The source said Heschel was shocked by the sudden bad turn in his relationship with the company. Heschel acknowledged that "sometimes curveballs come at you.

"Sometimes marriages don't work out either," he added. "It was just one of those situations that sometimes happen in life."

Strong willed

Singleton and Heschel both have reputations as strong-willed executives, and industry sources speculated about the possibility that their personalities clashed.

However, former SPAC Chairman DuWayne J. Peterson, who hired Singleton, said an impulsive action by Singleton "sounds out of character to me."

"I'm very surprised by the news," said Peterson, now top IS executive at Merrill Lynch & Co. in New York. "John is demanding, but fair, and a very good developer of people. He's not an egomaniac who doesn't want good people around him. He's very solid, one of the best business executives in any field."

Peterson said he met Heschel for the first time at a conference in Palm Springs, Calif., in late October, just weeks before Heschel's sudden departure. "He didn't seem to be under any pressure that I could sense," Peterson said.

Heschel, who had relocated with his family to the Los Angeles suburbs, said he will spend a quiet month before returning to the job-seeking trail. "The only good thing about this is it gives me some time to take the process slowly and think about what I want to do," he said.

Heschel spent much of his early IS career in Southern California at American Hospital Supply Corp.'s American McGaw Laboratories unit in Irvine. He later moved to American Hospital Supply and survived that firm's 1985 acquisition by Baxter to become its top IS executive and one of the most prominent spokesmen in the IS profession.

> "SOMETIMES YOU don't always fit as perfectly as you'd like. I don't want to get into it any further than that."
>
> MICHAEL HESCHEL
> (FORMERLY) SECURITY PACIFIC

Motorola 68040 shipment gets mixed welcome

BY MAURA J. HARRINGTON
CW STAFF

AUSTIN, Texas — The cheers for Motorola, Inc. were restrained last week after the company announced volume shipment of its fourth-generation 68000 family complex instruction set computing (CICS)-based microprocessor.

Analysts said the 68040, which is several months late, is an improvement over the 68030 and is competitive with current-generation reduced instruction set computing (RISC)-based microprocessors such as Sun Microsystems, Inc.'s Scalable Processor Architecture chip. But, they added, Motorola's inability to produce the chip in volume in a timely fashion has had an irreversible effect on the company and its customers competing in the Unix workstation market.

Hewlett-Packard Co. is one such example. Last year, analysts said HP was easily the No. 2 workstation vendor when the firm acquired Apollo Computer, Inc.'s product line. Because HP continues to rely on CISC-based technology to power its workstations, it was depending on the timely production of the 68040 chip when it announced its first combined HP-Apollo workstation last spring.

"When we learned about the product delay, we instituted models with the 68030 chip with inexpensive upgrade options to the [68040] as soon as it started shipping," an HP spokeswoman said. That upgrade, she added, costs $2,000.

That process, according to analyst David Card at International Data Corp., a market research firm in Framingham, Mass., caused HP to lose market share that it could have potentially held onto.

HP's market share loss, however, is not really a result of Motorola's late microprocessor, but more that of the increasing competition from the RISC workstation vendors, analysts said.

The increase in competition, as well as Motorola's delay in shipping the 68040, has caused several of the firm's potential customers to fall back or change their focus, analysts said.

"I don't think Motorola lost customers because they're shipping now and not six months ago. They lost customers because they are shipping now and not a year and a half ago," said Michael Slater, editor and publisher of the "Microprocessor Report," a trade newsletter.

Next, Inc. is basing its product line on Motorola's chip but has only 15,000 orders spread over the next nine to 12 months, Card said. Next was not hurt by the delay as much as HP, because it was not ready to ship its products, he added.

"The [68040] was a little bit later than we would have liked, but we've been working closely with Motorola, so we knew," said Rich Page, Next's vice president of hardware engineering. "The good news is that the chip is faster than we expected. We thought it would only run at 10 [million instructions per second], but we've found it to run at 15 MIPS."

The 68040 microprocessor incorporates the floating-point processor and integer unit on a single chip, which helps boost the performance between three and five times that of the 68030, said Jim Reinhart, marketing manager for the 68000 family product line.

Tandy chooses Novell over 3Com

BY JIM NASH
CW STAFF

FORT WORTH, Texas — Tandy Corp. has dropped its OEM agreement with 3Com Corp. and replaced 3Com with networking leader Novell, Inc.

Ed Juge, director of market planning at Radio Shack, a subsidiary of Tandy, said the company decided not to renew its OEM agreement, which expired Oct. 31. A spokesman for 3Com in Santa Clara, Calif., declined to comment other than to say it was a mutual decision.

"The majority of our [customers] are asking for the Novell network operating system," Juge said. "We've responded with what the market has asked for." However, Juge would not say if an OEM agreement had been signed with Novell.

"It was a friendly parting of ways," Juge said. "There will still be an association; we will supply whatever the customer wants," but only on a special order basis. Although Juge would not reveal how long Tandy had been contracting with 3Com for its local-area networking products, he said the two firms had been working closely for "two or three years."

About 700 of the 7,000 Radio Shacks had been selling 3Com equipment, including its 3+Share and 3+Open operating systems and Ethernet adapter cards.

John Girton, an analyst at Van Kasper & Co. in San Francisco, said the decision should have little negative impact. While there may be a movement away from the struggling firm at present, he explained, "3Com will stem that movement when they get the Novell protocol loaded on its server protocol stacks." 3Com has announced plans to deliver such a product.

Tandy has an OEM contract with The Santa Cruz Operation for its Xenix network operating system.

If you are presently using these systems, let IAM® reduce your Nightly Processing Time 50% to 80%

American Management Systems
CUFS (College Financial Systems)

American Software
General Ledger

Cyborg
Payroll

Computer Associates
CA7 - Banking Infopoint - CA11

TCC
Life 70

Data Design Associates
Financial Packages

Cincom
Mantis

HBO & CO
Hospital Applications

Group 1 Systems
Zipcode File

IBM
CICS - SMP/E
RMDS Netview DISOSS

Florida Software
Banking Applications

McCormack & Dodge
General Ledger, Payroll, etc.

Management Science of America
Accounts Receivable, Payable, etc.

Pansophic
Easytrive

Stockholder Systems
PEP+

In House Applications

IAM vs VSAM

IAM REDUCES THE SIZE OF YOUR VSAM FILES BY 30 TO 70%
IAM REDUCES VSAM EXCPs BY 50 TO 80%
IAM REDUCES VSAM CPU TIME BY 20 TO 40%

CICS and Batch applications make heavy use of keyed indexed VSAM (KSDS) files. VSAM is a prime bottleneck to the performance of these systems. IAM, a transparent alternative to VSAM, eliminates the VSAM bottleneck by slashing I/O and CPU time. IAM's Real Time Tuning monitors I/O activity, dynamically changing the number of buffers and I/O chaining. IAM completely eliminates the EXCPs to the VSAM index. IAM executes fewer instructions per record request. Batch processing times are dramatically reduced.

Call for a Free No Obligation
90 Day Trial
Supports MVS, MVS/XA and MVS/ESA
Makers of FDR and ABR

INNOVATION® DATA PROCESSING
275 Paterson Avenue, Little Falls, NJ 07424 • (201) 890-7300

NEWS SHORTS

User interface upgraded

Siemens Nixdorf Information Systems, Inc. updated its user interface development tool for the Open Software Foundation Motif environment last week with the announcement of Xbuild Release 1.1. The latest release of Xbuild reportedly allows users to extend the number of graphical objects used for an interface as well as customize the environment to a particular company's standards. As with the first version, Siemens Nixdorf will offer the software on a trial basis to users before payment is required. The software includes an object library and editors. Currently, the company will offer Xbuild for its own Targon systems as well as workstations from Sun Microsystems, Inc. and Digital Equipment Corp.

....

Businessland wins Kodak pact

Beleaguered personal computer dealer Businessland, Inc. said last week it will provide Eastman Kodak Co. with an automated computer products ordering and inventory-tracking system. Intended to reduce PC order times, offer on-line status reporting and improve record keeping, Cleanstream will be available to other users in the third quarter of next year, Businessland said. Also last week, Businessland announced more restructuring moves to stop its string of losing quarters. The firm will be segmented and will run as four business divisions: General Products, Network Systems, Service and Distribution.

....

NYSE closes 'down,' for real

The New York Stock Exchange is "still looking into" the cause of an electrical failure that halted trading on Nov. 23, an exchange spokesman said. The outage, which lasted about 1½ hours, was caused by some internal problems, he said. In the meantime, the exchange plans to install an uninterruptible power supply within the next 12 months because its existing battery-powered backup system did not do the job. Still, the exchange didn't suffer too badly from the 94-minute outage, which started at 9:41 a.m. and lasted until 11:15 a.m. Because it was the day after Thanksgiving, trading was light anyway.

....

Apple buys into RISC start-up

Apple Computer, Inc. continued to send out feelers into the area of reduced instruction set computing (RISC) technology last week with the announcement of a $3 million investment in a new chip company. The Advanced RISC Machines Ltd. venture plans to produce RISC chips that can be used in PCs and telephones and as embedded controllers in consumer and automotive electronics. No date has been set for an initial product offering. An Apple spokesman called the deal with Cambridge, England-based Advanced RISC Machines "strictly an investment opportunity." Apple is also working with Motorola, Inc. to integrate Motorola's RISC technology into its Macintosh line by as early as next year [CW, Oct. 15].

....

U.S. grooms firms for Japan entries

The U.S. Department of Commerce selected an elite group of 20 U.S. companies last week — including Oracle Systems Corp. and Compaq Computer Corp. — to get extensive government help in penetrating the Japanese market. The official "blessing" of the U.S. government will open the right doors in Japan, because Japanese business leaders will know that these prescreened companies are committed to a five-year program to boost sales in Japan, said Riley Repko, Oracle's director of government affairs.

....

Tandem plans software ties

Tandem Computers, Inc. is expected to announce this week that it will focus on applications software development through a new business partner program called the Tandem Applications Group. The new Tandem marketing arm will include the 6-year-old Alliance program for independent software vendors that write packages for Tandem's transaction-oriented computers. The development of new open systems software, including Unix applications, will be emphasized, Tandem executives told *Computerworld* last week.

More news shorts on page 120

Mac Classic: Just try to get your hands on one

BY JAMES DALY
CW STAFF

CUPERTINO, Calif. — If you are dying to see your fingers dance across the keyboard of Apple Computer, Inc.'s new Macintosh Classic any time in the near future, sit tight: Company officials said they will be unable to meet demand for the entry-level machine until late March.

The Classic, which was introduced six weeks ago along with the higher-priced Macintosh LC and Macintosh SI, has become a victim of its own success. Pent-up user demand for a low-cost Macintosh — the Classic sells for between $800 and $1,500, depending on configuration — and Apple's $40 million advertising campaign have brought buyers flocking to retailers with checkbooks in hand. But chains such as Computerland Corp. said their shelves are bare of the Classic and that back orders may take weeks to fill.

Get 'em while they're hot

"The Classic is the hottest model we've got today, but we just can't get them," said Edward Anderson, president of Computerland in Pleasanton, Calif. "Obviously, it's causing a strained feeling among our dealers." Anderson would not speculate on how many sales were lost because of the undersupply.

Apple officials have scrambled to step up production, but analysts said the shortages could undermine the machine's original mission to win back mass-market shoppers from low-cost IBM Personal Computer clones.

Apple has seen its share of the $42.3 billion domestic PC market plummet from about 15% only a few years ago to about 10% today, according to Dataquest, Inc., a research firm in San Jose, Calif.

Potential users said the shortages of the Classic and the delayed availability of the LC — early volume shipments are not expected until late January — are frustrating in light of the early hype.

"Apple is really missing the boat here," said Rick Christjansen, manager of information systems at Manville Corp. in Denver. "There's going to be a lot of [IBM Personal System/1s] under the tree this Christmas instead of Classics or LCs because of that mistake." Christjansen, a self-described Apple devotee, said he will begrudgingly await the high-volume arrival of the new models, which he sees as basic corporate computers rather than just home or small business systems.

Retailers, however, have downplayed the seasonal appeal of the Classic. "The Classic is not an impulse buy," Anderson said. "It's a business buy, and people will wait."

Half the price

Analysts said they see the Classic, which essentially duplicates the discontinued Macintosh SE at half the price, as a key revenue generator for Apple. Paul Norris, an analyst at Gartner Group, Inc., a research firm in Stamford, Conn., estimated that 1 million Classic sales are possible within the next year — if Apple can alleviate the shortages.

Fred Forsyth, senior vice president of worldwide manufacturing, said Apple tried to do too much too fast. "We introduced three new products in 121 countries in one day; we've never done that before," he said.

In response to the shortages, Forsyth said, the Singapore manufacturing plant where the Classics are made will go from a five-day, two-shift schedule to a seven-day cycle where manufacturing is done nearly nonstop. The machines will also be air-shipped around the world, instead of by boat, as had been done earlier. Classic production has also been initiated at a Cork, Ireland, plant for European distribution, he added.

Microsoft

FROM PAGE 1

the Buick Motor Division of General Motors Corp. in Flint, Mich. Newell said that "someday" the company would like to integrate multimedia into its dealer training program, "but it's a little too cost-prohibitive at this point."

Manufacturers said an entry-level multimedia setup would include an Intel Corp. 80286-equipped personal computer or higher, a compact disc/read-only memory drive, at least 2M bytes of random-access memory, a 30M-byte hard disk, standard or enhanced IBM Video Graphics Array, enhanced audio and the Windows multimedia extensions — additions that could add several thousand dollars to the cost of a typical PC configuration.

Some early multimedia users, however, said the cost justifies the results. "The payback in personnel training, cost savings and increased productivity can be tremendous," said Meg Lewis, manager of advanced technology at American Airlines in Dallas. American has already begun integrating multimedia applications into the training of its pilots, maintenance engineers and travel agents, Lewis said.

Analysts said Microsoft's announcement confronts the most important hurdle facing the widespread integration of multimedia into the DOS world: a severe lack of software. Software houses have so far targeted most of their multimedia development efforts at more graphically-oriented PC platforms, such as Apple Computer, Inc.'s Macintosh and Commodore Business Machines, Inc.'s Amiga. With the introduction of Microsoft's Windows 3.0 in May, however, the DOS world suddenly assumed a more graphical feel.

> "TECHNOLOGY for technology's sake is becoming increasingly hard to justify in this economic climate."
>
> NANCY NEWELL
> BUICK MOTOR DIVISION

The specifications, which co-developers Microsoft and IBM announced at the outset of Microsoft's Multimedia Developers Conference, could lower the entry price by standardizing development efforts in two areas: common data file formats and applications programming interfaces for controlling media devices. The Redmond, Wash.-based software firm also announced its multimedia development kit.

Tandy Chairman John Roach said it will begin shipping development systems and expects to have multimedia products available by next year. "I intend to go into this with the same type of barnstorming as we did in the early years of the PC industry," Roach said.

Analysts said the match with Tandy and its Radio Shack chain of retail electronics outlets is a good one. "I don't think there is a better dealer network in the country than Radio Shack for selling multimedia systems," said Nick Arnett, editor of the "Multimedia Computing & Presentations" newsletter in Santa Clara, Calif. "There's nobody else who's nearly as successful as Tandy at selling both consumer electronics equipment and audiovisual equipment."

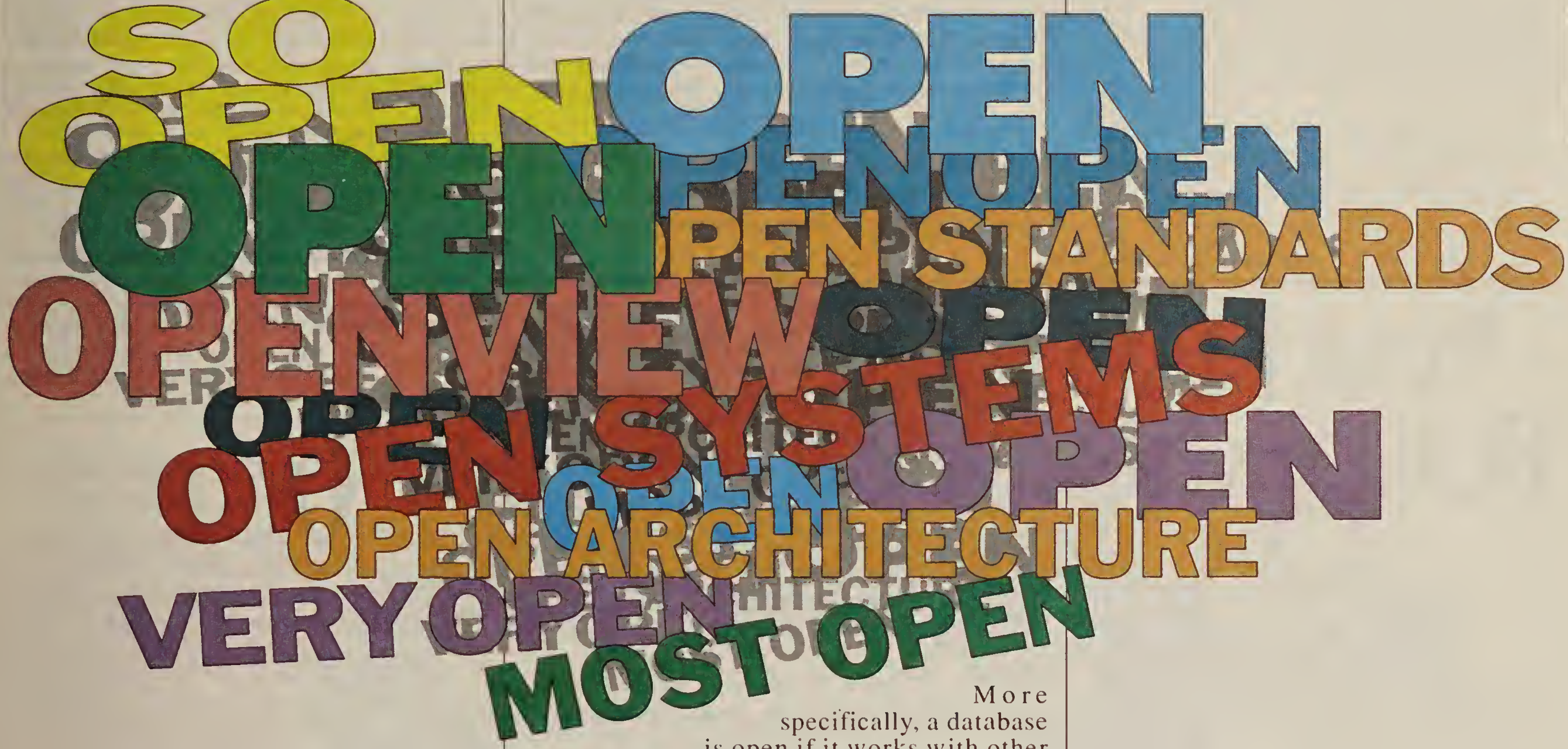
Other companies that said they would deliver PCs supporting the specification in 1991 were Compuadd Co., Fujitsu Ltd., NEC Technologies, Inc., Ing C. Olivetti & Co. and Zenith Data Systems.

Closing Arguments

Only ORACLE supports virtually every vendor's software, hardware and network.

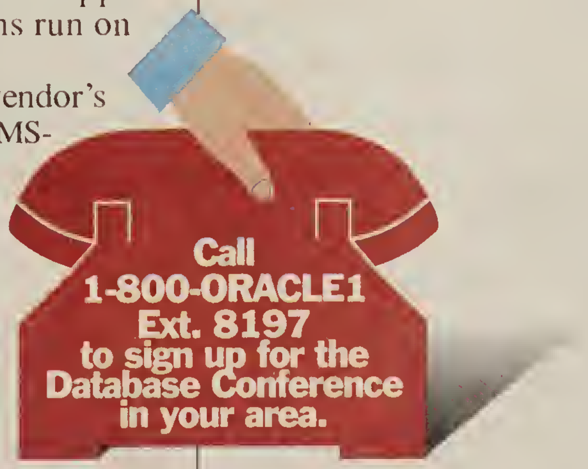
Today, some software companies claim that their software products are "open." They may even graft the word onto their product names. It is a confusing situation, but a clear definition of "open" is finally emerging.

Software is "open" only if it adheres to industry standards and works with products from other vendors.



More specifically, a database is open if it works with other vendors' databases. For example, ORACLE provides access to IBM's DB2, SQL/DS and DEC's RMS.

An open database should also work with other vendors' applications. ORACLE works with DEC's All-in-1, DG's CEO, IBI's Focus and SAS. And it supports PC and Mac software like Lotus 1-2-3, WordPerfect, Borland's Paradox and Apple's Hypercard. Even Dbase applications run on ORACLE.



Software is open if it runs on every vendor's operating system. ORACLE runs on MS-DOS, OS/2, Mac OS, UNIX, VMS, MVS and virtually every other operating system on the market.

And software is open if it supports every vendor's network. ORACLE supports IBM's LU6.2, LAN Manager, NetBIOS, DECnet, Novell's SPX/IPX, industry standard X.25 and TCP/IP and many others.

Choosing open software today lets users choose any vendor's hardware, software and network tomorrow.

Call 1-800-ORACLE1 ext. 8197 to sign up for an Oracle Database Conference near you. And keep your software and your options open.

ORACLE®

Compatibility • Portability • Connectability

©1990 Oracle Corporation. ORACLE is a registered trademark of Oracle Corporation. All trade names referenced are the service mark, trademark, or registered trademark of the respective manufacturer. Call 1-800-ORACLE1 for hardware and software requirements.

Autolite shuns IBM mold

Allied's spark plug unit preserves shop-floor Unix system

BY ELISABETH HORWITT
CW STAFF

FOSTORIA, Ohio — After weeks of debate, Allied Signal Corp.'s Autolite Spark Plug Division finally got management approval last week to break with the Allied automotive sector's IBM tradition. The division will replace a 15-year-old IBM 4381 manufacturing resource planning (MRP) system with a packaged MRP system based on Oracle Systems Corp.'s SQL-based relational database management system and running on a Sequent Computer Systems, Inc. Unix processor. Autolite needs to install an MRP system that runs on top of a SQL-based, truly relational DBMS in order to integrate its scheduling and business systems with an existing Oracle-based shop-floor control system, according to Autolite project engineer Richard Sturgeon.

Management's decision to let Autolite design its MRP system for compatibility with its existing shop-floor system — rather than vice versa — was an acknowledgment of the division's "desire to preserve their investment" in the shop-floor system, said Carole Pritchard, the sector's director of information systems and planning. The value of that investment was proven in 1989, when the system helped Autolite boost its productivity by 13% to become the most productive division within its sector [CW, Nov. 19].

At the heart of the shop-floor system is a distributed network of OS/2- and Unix-based computers running Oracle's SQL Server software. The servers use Netwise, Inc.'s RPC Tool remote procedure call software to collect real-time shop-floor data from IBM Personal System/2-based devices, which in turn interface with intelligent shop-floor equipment. The servers make the collected data available to a wide variety of users, including accountants, process engineers and shop-floor managers, Sturgeon said.

Autolite's Advanced Manufacturing Group had the foresight to bring the division's IS group into the project meetings early, Sturgeon said.

"Our engineering folks are way out in front of us, which is not a very comfortable position to be in, from an IS standpoint," said Ronald Williams, manager of application support at Autolite. "We haven't gotten in their way; we want to get on that train and reap the benefits."

However, when Autolite was ready for the next step of integrating the shop-floor system with the MRP system and proposed a Sequent Unix-based solution, it came up against the automotive sector's "dominant strategy" to use IBM, according to Pritchard.

Before it went to Sequent, Autolite had carefully evaluated a number of IBM-based MRP systems, including an Application System/400-based strategy that had been adopted by a number of other Allied automotive sites. But the division concluded that integrating an AS/400 system with the existing shop-floor system would be too difficult because the AS/400 does not yet have a truly relational SQL-based DBMS, Sturgeon said.

> "OUR ENGINEERING folks are way out in front of us, which is not a very comfortable position to be in, from an IS standpoint."
>
> RONALD WILLIAMS
> AUTOLITE

"We have established a strategy at Autolite that is based on free access to data that requires a relational model throughout the enterprise," Williams said. "The only way to do that successfully at an IBM site is to go to DB2, which Autolite's infrastructure is not big enough to support."

The automotive sector as a whole "will watch Autolite to see how useful and feasible their system is," Pritchard said. "We want to learn from their success, copy what we can and go beyond." Indeed, the sector's IS department has begun to guide people toward migrating their applications to commonly accessible, nonproprietary databases, she added.

However, Pritchard said, "I don't know if picking up the system Autolite implemented and dropping it someplace else would achieve the same productivity gains." Whether the automotive sector will migrate to a SQL-based RDBMS "will depend on where IBM goes with SQL on its AS/400 and other platforms," she said.

Autolite has no intention of hopping aboard the automotive sector's AS/400 bandwagon, Sturgeon said. However, Sturgeon and his group intend to evaluate IBM's AIX-based RISC System/6000 as a possible migration option in a year or two. Migration to the RS/6000, if Autolite does choose that road, "is likely to be easy," Sturgeon said, given that IBM's workstation already supports Oracle.

Meanwhile, Sturgeon and his group are preparing within the year to start the next phase of moving Autolite's financial applications to Oracle and Unix.

"WE HAD TWO CHOICES: BUILD A NEW DATA CENTER OR GET SOME PCs AND REALIA COBOL."

Michael Abrahamson
Wagner Stott Clearing Corporation
subsidiary of Merrill Lynch

"Our mainframe overload was severe, and there wasn't room to bring a larger, water-cooled mainframe into the existing data center," Abrahamson explained. The solution was PCs with Realia COBOL and RealCICS.

"One program took 50 minutes to execute on our high-end 4381," said Abrahamson. "The same program, with the same file, ran in 4:03 minutes after being downloaded to the PC.*

"We're very satisfied with the PC as a workstation environment. CICS COBOL programs compile in seconds, not minutes. Realia's done an excellent, very faithful mainframe emulation.

"The software is robust and the technical support is very good. It's worth a lot to know that you have somebody knowledgeable to deal with."

Call Realia for a free evaluation of the Realia programming environment.

*PC was a 20 MHz 80386 AT clone with an ESDI-controlled hard drive. Average access time of hard drive was rated at 23 milliseconds.

REALIA®

U.S.: 312/346-0642 • U.K.: 071/602-8066 • CANADA: 613/725-9212

Running In More Powerful Circles

ORACLE for IBM lets your mainframes share data with all your computers. Not just other mainframes.

It seems every other consultant, editor and PC user is gleefully proclaiming the death of mainframe computing. And with it, the end of MIS's influence.

Guess again. According to a 1990 user survey,* 64% of all new applications developed in '90 and '91 will be on mainframes. And what's more, Computer Intelligence says that 79% of mainframe sites also have minis, PCs and workstations.

The challenge then, is to find a way to integrate those valuable mainframes with all the other computers in the company.

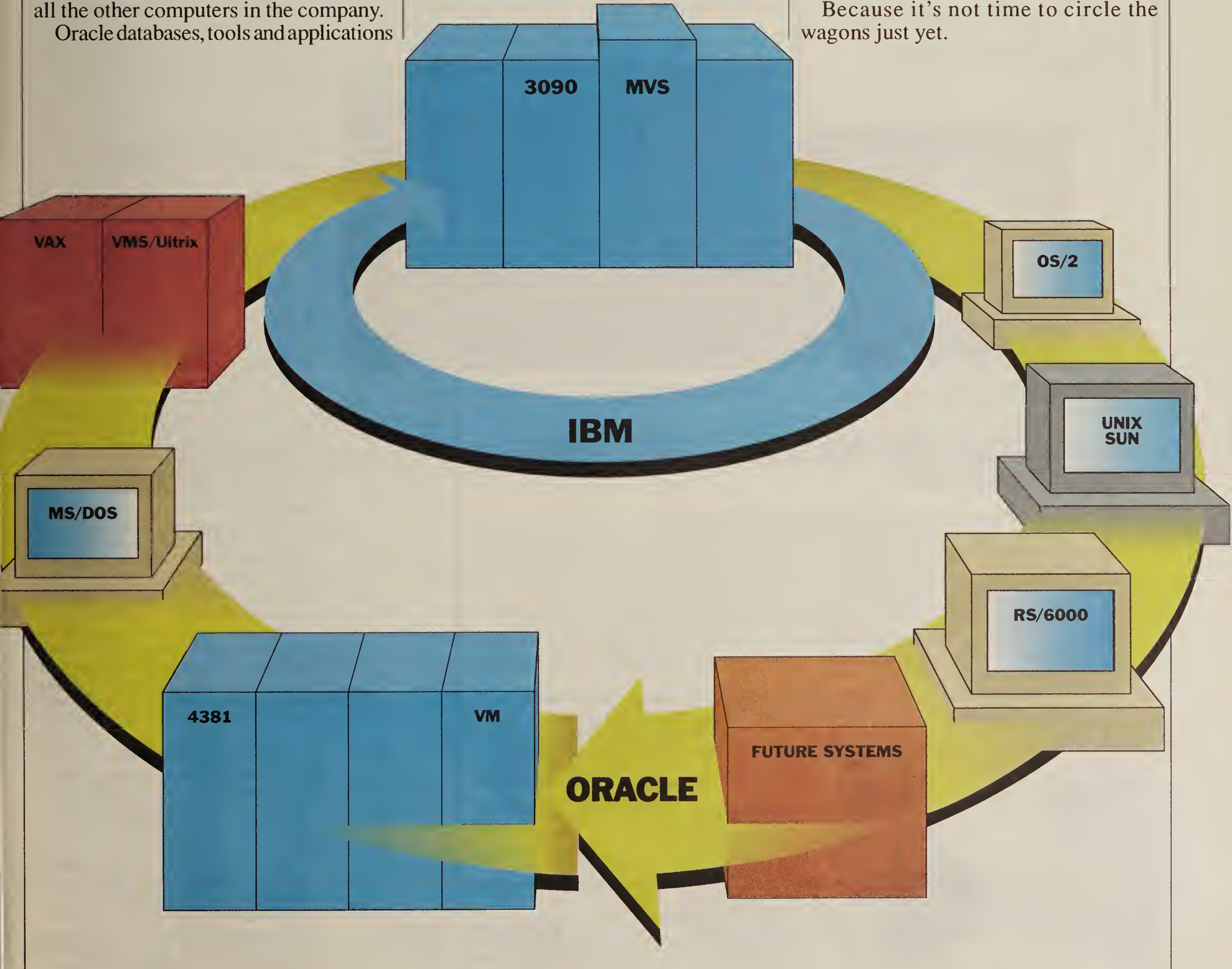
Oracle databases, tools and applications run unchanged on virtually every mainframe, mini, PC and workstation. From MVS and VM mainframes to DEC VAXes. From RS/6000 UNIX workstations to OS/2 and MS-DOS PCs. Even the Macintosh.

But more than just running on these computers, Oracle software integrates them into a cooperative computing and information sharing network. So businesses can protect their mainframe investment, while freely introducing alternate technologies.

Oracle provides the reassurance of being the largest database company in the world. In fact, over half of the 8,000 Oracle employees are devoted to customer service.

If you're interested in widening your circle of influence, call 1-800-633-1073 ext. 8117 for more information. Or to sign up for the free ORACLE for IBM Management Seminar in your area.

Because it's not time to circle the wagons just yet.



ORACLE®

Compatibility · Portability · Connectability

*1990, Datamation/Cowen & Co. user survey.

©1990 Oracle Corporation. ORACLE is a registered trademark of Oracle Corporation. All trade names referenced are the service mark, trademark, or registered trademark of the respective manufacturer. Call 1-800-ORACLE1 for hardware and software requirements.

EMC to appeal guilty judgment in Cambex suit

BY ROSEMARY HAMILTON
CW STAFF

HOPKINTON, Mass. — EMC Corp. plans to appeal a guilty judgment handed down against it late last month in a lawsuit filed by Cambex Corp., its chief rival in the mainframe third-party memory business.

EMC was found guilty of the misappropriation of certain trade secrets concerning its IBM 3080 memory upgrade product line. It could be required to pay Cambex at least $2 million, which is the amount the jury determined Cambex lost and EMC gained from the 3080 memory market.

Cambex plans to seek a trebling of damages. However, the amount of Cambex's reward will not be determined until next month by the Middlesex County Superior Court in Massachusetts, at which time EMC plans to launch its appeal.

While Cambex applauded the court's decision, the initial fallout for EMC appeared to be minimal.

A spokesman for Storage Technology Corp., EMC's biggest business partner, said the guilty verdict should not influence its relationship with the company. "It doesn't involve a product that we are selling, and it doesn't involve anything affecting our future plans," the spokesman said.

"It never helps your reputation to lose a lawsuit, but chances are it won't hurt them very much because it's not a very big deal now," said Sheldon Grodsky, director of research at Kenneth, Jerome & Co. in Florham Park, N.J. "That particular market [of 3080 memory] has diminished, and it's not a market for EMC today."

Minimal business

Sheldon Schenkler, Cambex's chief financial officer, acknowledged that the 3080 business is minimal. However, he added that "we achieved justice. We also hope that customers will look at the findings and make their own assessments."

Schenkler claimed that EMC's 3080 business helped the company launch its more recent 3090 memory business, a market in which Cambex also competes. "Certainly they didn't do any stealing for the 3090s, but logic will tell you that what they did goes directly to 3090 business," he said.

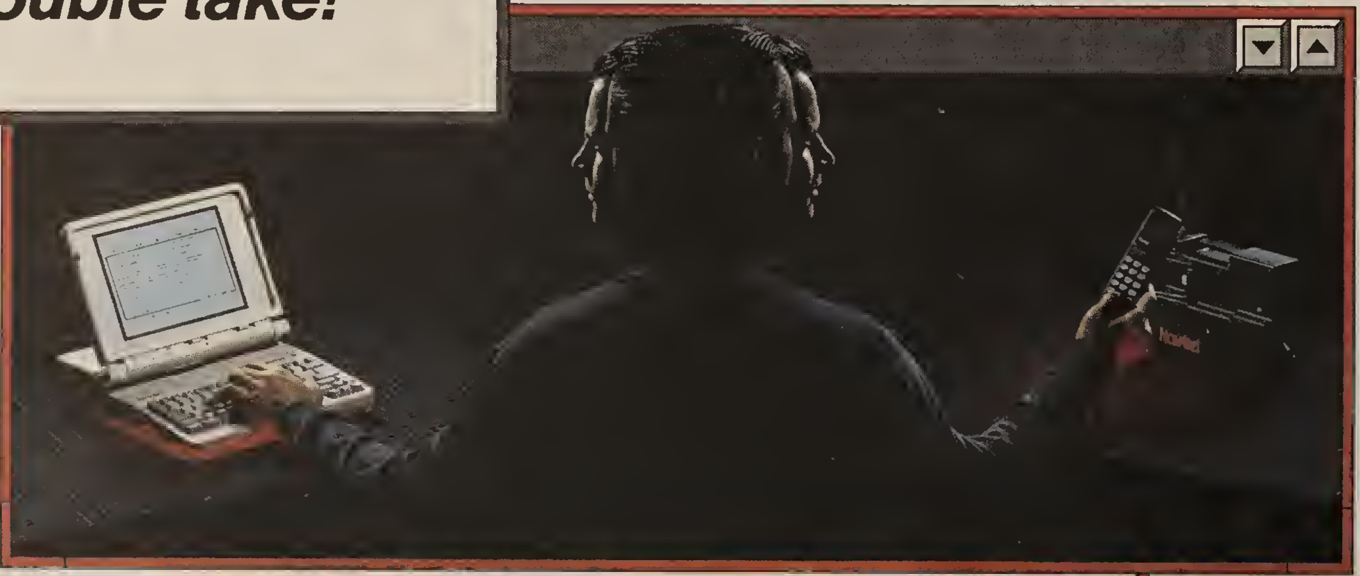
Cambex's lawsuit was filed in 1987 and focused on a consultant, Richard Belanger, who was said to have worked for both Cambex and EMC on the development of their 3080 products.

According to Cambex, Belanger worked on microcode changes that were necessary for the IBM mainframes to recognize non-IBM memory. The microcode changes were actually licensed from another source, Allen-Myland, Inc., in Broomall, Pa., but required additional fine-tuning, which was Belanger's job. Cambex claims the consultant took that fine-tuning to EMC.

EMC maintains that the microcode changes had been available from various other sources.

"There was nothing that was their property," EMC spokesman Brian Fitzgerald said. "The material involved is available from a number of different sources."

A laptop deal that will make you do a double take!



ZENITH DATA SYSTEMS INNOVATES AGAIN™

The Double Take Deal—Buy a Zenith Data Systems VGA laptop PC and get a NovAtel HardPac™ transportable cellular phone. A $799 retail value!

Here's a deal so great, you'll look once, and then again!

It starts with one of these VGA laptop PCs from the number one laptop brand in America.* The SupersPort® SX, giving you Intel386SX™ performance for advanced applications. The SupersPort 286e, with the speed and power to tackle huge spreadsheets, files and databases. Or the new SlimsPort™ 286, the 9¼ pound laptop with full-size 286 performance. All feature VGA graphics and Zenith Data Systems' *Intelligent Power Management™ System* that lets you control battery life.

Simply buy one, then, you'll receive a NovAtel HardPac transportable phone** at no extra charge! It has 3 full watts of power, handsfree operation, and stores 99 frequently called numbers.

So maximize your productivity on the road by turning your travel time into work time. Take us up on the Double Take Deal! Call now. **Offer ends December 31, 1990.** For more information and the name of the Zenith Data Systems Medallion Reseller nearest you, call

1-800-523-9393.

ZENITH data systems
Groupe Bull

*Source: 1990 Dataquest estimate for U.S. battery-powered laptops. **Subject to credit approval, a six month service commitment with GTE Mobile Communications, and the completion of a liability release. A deposit may be required. Offer void where prohibited and where activation requirement is prohibited by state law. See complete rules for details at participating Medallion Resellers. HardPac is a trademark of NovAtel Carcom, Inc. Intel386SX is a trademark of Intel Corporation. Graphics simulate Microsoft* *Windows™ version 3.0*, a product of Microsoft Corporation. *Intelligent Power Management* is a trademark of Zenith Data Systems Corporation. © 1990 Zenith Data Systems Corporation

Hitachi shows general-purpose neural computer

BY JOHANNA AMBROSIO
CW STAFF

NEW YORK — Hitachi Ltd. demonstrated a neural computer at its technology fair held here last week. But the computer is not going to be commercially available for at least two years, Hitachi executives said.

The computer is in "an experimental stage," said Yasutsugu Takeda, general manager at Hitachi's Central Research Laboratory in Tokyo.

Modeled after the human brain, the computer has 1,152 connected "neurons," which act as learning capacitors. These work with a traditional microprocessor to perform up to 2.3 billion operations per second.

Because of wafer-scale integration and other advances in semiconductor technology, all the neurons and the machine's microprocessor are contained in a cabinet that measures 1 foot high by 8.3 in. wide by 9 in. deep.

Uses humanlike intuition

Hitachi is calling this a "general-purpose" computer that is meant for tasks such as stock price prediction and signature verification, which require humanlike intuition.

Like the human brain, this computer will be able to learn quickly and build on its knowledge base because of all the built-in neurons, Hitachi said.

According to Takeda, the computer will be available in Japan in about two years, with U.S. availability sometime after that.

The Hitachi neural computer represents an advancement over a neural computer Hitachi announced in September 1989 that had 576 neurons.

Only The Most Advanced RDBMS Can Relate To This.

Today, you need on-line, real-time access to information.

No matter where it resides. No matter what form it takes. No matter how old it may be.

Only SYBASE seamlessly integrates data sources of every kind into an advanced client/server environment. Data from an RDBMS or flat files, SQL or non-SQL. Application services like electronic mail. Real-time data feeds like stock quotes, satellite transmissions, process control data. And most important for mainframes, SYBASE leverages legacy applications written in PL1, COBOL, or Assembler that you can't afford to rewrite.

SYBASE mainframe access is through SNA and CICS to provide both turnkey access to DB2 and transaction specific access to VSAM, IMS/DB or any other data source accessible from CICS. (IMS/DC support is coming.) This preserves pre-existing mainframe security and integrity rules, so you can do far more than decision support—you can now integrate new transaction processing applications with old ones.

In short, you can safely make your mainframe a server.

In today's real world of multivendor environments—including MVS, VMS, UNIX, and OS/2, with PC and Mac integration—SYBASE lets you leverage prior hardware and software investments while keeping your options open for the future.

To find out what else the most advanced RDBMS can do for you, call 1-800-8-SYBASE. We'll be happy to give you the time and place of the next free Sybase Seminar nearest you.

SYBASE®

Client/Server For The On-Line Enterprise

For seminar reservations or information on the 1991 Sybase User Meeting and Training Conference (January 6-10 at the San Francisco Hilton) call 1-800-8-SYBASE.

©Sybase, Inc. 1990. Other company or product names may be service marks or trademarks of their respective companies.

SAS System optimized for OS/2

BY SALLY CUSACK
CW STAFF

CARY, N.C. — SAS Institute, Inc. last week released a version of the SAS System optimized to tap into the memory potential under IBM's OS/2 operating environment.

The SAS Applications System Under OS/2 supports Release 1.2 and higher of OS/2 for Standard and Extended Editions using Presentation Manager.

Introduced in 1976, the SAS System is an integrated software package for managing, analyzing and presenting data. It operates across a variety of vendor hardware platforms, including those from IBM and Digital Equipment Corp.

Danny Wu, systems manager at the Memorial Sloan-Kettering Cancer Center's Biostatistic Department in New York, said the SAS OS/2 release eliminates the memory constraints he experienced with the package under MS-DOS. His department uses SAS on DEC VAX/VMS machines and MS-DOS computers to run programs on biomedical survival analysis.

Other users agreed that the additional memory capabilities in the OS/2 version are necessary for many of their applications.

Michael Virnig, senior scientist at the Grand Metropolitan Technology Center in Minneapolis, said the OS/2 environment "seemed like a better fit for our applications."

The technology center conducts research for Pillsbury Co. and other food manufacturers and was previously running SAS software on an IBM 4361. After deciding to eliminate the larger machine, Virnig said, "We had to find a new home for our applications, and at the time, one-third to one-half of the processor was used for SAS."

Virnig added that the company did not want a minicomputer, choosing to take advantage of an application that could run on its existing 300-user Novell, Inc. Netware local-area network instead.

The SAS Applications System Under OS/2 utilizes many native OS/2 functions, including Dynamic Data Exchange, Named Pipes and Unnamed Pipes. The software supports the IBM Personal System/2 and compatibles and can run on several LANs.

First-year licensing fees for the product range from $695 for one workstation to $9,695 for 100 workstations.

CA in legal tiff with ex-employee

BY JOHANNA AMBROSIO
CW STAFF

MINEOLA, N.Y. — Computer Associates International, Inc. filed a lawsuit against a former employee who recently left to start his own firm. The suit, filed on Nov. 9, came to light last week.

The lawsuit claims that Payman Pouladdej, formerly a vice president of research and development at CA, breached his employment and other contracts, which stated that he would not solicit current CA employees to join his new firm. The CA complaint says Pouladdej has been "actively soliciting" CA employees "since at least" August.

In mid-October, Pouladdej left CA to form Softblox, Inc., based in Huntington, N.Y., which plans to sell cooperative processing tools. The other Softblox principal is William Habermaas, a CA cofounder who left the firm two years ago.

The suit does not name Habermaas or Softblox as defendants.

"It's a laughably frivolous suit. It's not winning they're after; their legal department is quite active, and you can infer whatever you want from that," Pouladdej said.

The suit was brought because of a "personal problem" that CA executives have "with my leaving," Pouladdej claimed.

Pouladdej charged that a third person, also a CA vice president, had been "coerced" into staying at CA "through strong-arm tactics by high-level CA executives." The unidentified person had resigned from CA shortly after Pouladdej did, he said, only to wind up staying at CA.

Through a spokesman, CA executives declined to comment on these charges. However, a CA attorney, Michael McElroy, said, "There have been no strong-arm tactics. That simply isn't true." He disputed Pouladdej's version, saying that the unidentified vice president "had never tendered his resignation. He had rejected [Pouladdej's] offer."

CA's suit seeks a permanent injunction against Pouladdej's solicitation of CA employees. No monetary damages, besides the cost of the legal action, are sought. A hearing about whether to grant a temporary restraining order will be held this Friday.

Pouladdej said the suit will not interfere with Softblox's ability to operate. "The suit is obviously not helping us, but it won't put us out of business. We have personal capital to last us until we get products off the shelf."

Softblox's workstation components are almost done, he said, and the company is now seeking a partner, either a software vendor or a user organization, to work with on the mainframe side.

More Preferred Stock.

At Data Preference, you're assured of filling all your computer needs—from a single source. Because, whatever your Apple® preference, we have more of it in stock.

Blue-chip stock—like the new Macintosh® IIfx—Apple Computer's fastest, most powerful Mac® ever. Plus, more of the high-performance Macintosh IIci. Offering built-in video support, it runs most applications up to 45% faster than the Macintosh IIcx. And we're also well-stocked with the fast and expandable LaserWriter® II.

Having the rental industry's largest, most comprehensive stock of Apple products, however, isn't the only reason so many companies are bullish on Data Preference. We also offer more preferred services and options. Like installation, on-site maintenance and return-to-depot programs. Plus a toll-free number for on-line diagnostics. As well as financial plans that fit your individual needs and personal preference. Perfectly.

So call Data Preference now—and get more dividends on the stock more people prefer.

DATAPreference MicroAge®
Formerly Leasametric Data Communications, Inc.

Northwest 800.343.7368, 415.574.5797 • Southwest 800.638.7854, 818.708.2669
Central 800.323.4823, 708.790.2050 • Northeast 800.241.5841 • Southeast 800.241.5841, 404.925.7980
London 011.44.923.897000. Copyright © 1990 Data Preference Incorporated.
Apple, the Apple logo, Mac, Macintosh and LaserWriter are registered trademarks of Apple Computer, Inc.

Authorized Dealer

CSX Transportation uses BMC Software products for the long haul.

CSX Transportation, one of IBM's largest North American customers, believes that licensing BMC's IMS, CICS and DB2 products makes good business sense now and in the future.

The fast track

Kerry Tenberg, DB2 Technical Specialist says, "BMC consistently offers quality products that significantly increase our productivity. BMC also provides responsible and knowledgeable support representatives. The support is terrific."

According to Tenberg, BMC's outstanding track record at CSX with IMS and CICS, as well as DB2, is why new BMC products are evaluated; function, performance and quality are why BMC products are brought on board.

The long haul

"To help us stay on the leading edge of technology, BMC provides continuous product growth and evolution. For instance, we've been extremely pleased with how fast BMC's DB2 products exploit new DB2 capabilities. Our participation in BMC product development focus groups has convinced us that BMC's commitment to future development will continue," says Tenberg.

Get on track with the leader

Find out how BMC Software can offer you a single vendor solution to get you on track and keep you on schedule. For more information on BMC's IMS, CICS and DB2 products call

1 800 841-2031
or FAX your request to:
713 242-6523.

BMC
SOFTWARE

Internationally, contact one of BMC's wholly owned subsidiary offices in:

Australia	Denmark	England	France	Germany	Italy	Japan	Spain
(61)3 819 6733	(45)44 68 22 00	(44)276 24622	(33) 1 48 77 77 77	(49) 69 664060	(39) 2 48193850	(81) 3 837-8651	(34) 1 639 30 62
FAX:(61) 3 819 6758	FAX:(45) 44 68 33 00	FAX:(44)276 61201	FAX:(33) 1 48 77 01 17	FAX:(49) 69 6661047	FAX:(39) 2 48193846	FAX:(81)3 837-8585	FAX:(34) 1 639 42 75

IBM Business Partner

IBM is a registered trademark of International Business Machines Corp.
DB2 is a trademark of IBM Corp.

© 1990 BMC Software, Inc. All rights reserved.

© 1990 AT&T

Now you can have high-speed data

AT&T's ACCUNET® Spectrum of Digital Services gives you the capacity and bandwidth that fits your company's needs.

Now you can upgrade your private network's capacity without carrying a full 24-channel load. Our ACCUNET Spectrum of Digital Services lets you expand at your own pace with only the number of channels you need. And no matter how small your particular piece of the pipe happens to be, ASDS gives you all the options you could want.

Choose from speeds of 9.6, 56, 64, 128, 256, 384, 512 or 768 kbps. Whether you need capacity for voice, bulk data transport or SNA Polling, or bandwidth for special applications like image processing, video conferencing or CAD/CAM, ASDS can accommodate your needs. We've also got more locations than any comparable service. More than 500 in all.

When it comes to reliability, you can't do any better than AT&T. AT&T offers it's customers the highest percentage of error-free seconds of any digital carrier.

And then there are the features that will appeal to your budget managers. Since we have more points of presence than anyone else, chances are you can take advantage of lower access charges.

without taking on the whole pipe.

And, of course, there's the whole point of going the ASDS route in the first place: you only pay for the capacity you need.

So if you need to add capacity to your network but you don't want to take on the whole pipe, give us a call. If we haven't already, we can probably take a load off your mind.

Value.
Another AT&T advantage.

For more information about the ACCUNET Spectrum of Digital Services, call your AT&T Account Executive or 1 800 247-1212, Ext. 107.

AT&T
The right choice.

ADVANCED TECHNOLOGY

TECH TALK

Warmed-over chip

■ Researchers at the University of Wisconsin at Madison and Sandia National Laboratories in Albuquerque, N.M., have developed what they said is the world's first high-temperature superconducting transistor. The device, called a superconducting flux-flow transistor, has been coupled with passive microwave components to create circuits, said David Ginley, Sandia's supervisor of semiconductor research. The transistor operates at minus 320 degrees Fahrenheit.

Model modeler

■ Spatial Technology, Inc. in Boulder, Colo., recently said that its new Release 1.2 version of ACIS Geometric Modeler will be the first solid modeler designed as a tool kit for virtually any computer-aided design and manufacturing application and the first hardware and software independent geometric modeler to run on platforms ranging from Intel Corp. 80386-based personal computers to the IBM RISC System/6000 engineering workstation. Among the enhancements to the new release are multistage Boolean operations, never before available in geometric modelers, that provide an architecture for highly customized surface construction routines. The new release is expected to be available in the second quarter of 1991.

Tiny but super

■ Trident Microsystems, Inc., a Sunnyvale, Calif., developer of very large-scale integration chips, introduced a custom-designed Super Video Graphics Array chip last week that is the smallest on the market, the company said. The new chip, called the TVGA8900C, features 1,024- by 768-pixel resolution with 256 colors in interlaced and noninterlaced mode. The more efficient use of space on the chip allowed the firm's engineers to add more features to the chip. The new chip is slated to ship in February.

It's a whole new HDTV ball game

High-definition TV still front and center, but digital tech has shaken up the rosters

BY MICHAEL ALEXANDER
CW STAFF

High-definition television (HDTV), which promises to deliver the quality of motion pictures and compact disc sound to homes and businesses alike, has been viewed as the last competitive battleground for U.S. electronics manufacturers. Give up HDTV development to Japanese and European competitors and with it will go a wide range of technologies and industries dependent on high-resolution displays, several manufacturers have argued.

That was then, and this is now. Today, HDTV is still being touted as the final bastion for U.S. industry, but it is no longer the same HDTV. Instead of being based on analog technology, HDTV systems now being proposed or under development will be either partly or entirely digital transmission systems. What is more, digital technology is being hailed as a way for U.S. companies to leapfrog offshore competition and take the lead in custom chip design, high-resolution displays and many other areas.

Digital video technology for HDTV and other applications was thought to be three to five years away. However, in June, General Instruments Corp. stunned rival HDTV proponents when it unexpectedly submitted a completely digital HDTV system for Federal Communications Commission evaluation. This impelled Philips Telecommunications N.V., Thomson SA in France, SRI International's David Sarnoff Research Center and NBC to form a consortium to also introduce a completely digital system. Zenith Electronics Corp. has proposed a system partly based on digital technology.

FCC testing HDTV

Two weeks ago, the FCC said it would begin testing HDTV systems in April 1991 as a preliminary to deciding on a standard. The FCC has winnowed 22 proposed systems down to six; three of those systems use digital technology. The FCC said it planned to decide on an HDTV standard in the spring of 1993.

"That may be rushing things," said Peter McCloskey, president of the Electronic Industries Association. McCloskey last week delivered the opening remarks at the Second International Workshop on Digital Video Communications, sponsored by the Electronic Industries Association and the Institute of Electrical and Electronics Engineers, Inc. in Cambridge, Mass. "The remarkable advances in digital compression techniques have changed the whole ballpark."

Up to this point, the FCC and the Bush administration have been criticized for not taking a more active role in fostering research and development for HDTV systems. Now, HDTV proponents say the FCC's lack of action has allowed time not only for digital video systems to emerge but also for allowing its proponents to hammer out standards for compression and transmission as well as resolving other issues that the technology raises.

"The U.S. has taken, some would say by accident, an approach that makes economic sense," said Sidney Topol, former chairman of Scientific-Atlanta, Inc. and now a fellow at the John F. Kennedy School of Government. "Our approach to choose a set of transmission standards for terrestrial, satellite, telephone and cable companies will win out."

▲ **Weinstein foresees** *"HDTV on workstations before home TV sets"*

McCloskey notes *"remarkable advances in digital compression"* ▶

Photos by Stella Johnson

The notion that Japan and Europe are ahead of the U.S. in HDTV is untrue, Topol said. "The HDTV picture is chaos and confusion in Europe," with as many differences as there are national boundaries. In Japan, where HDTV was launched earlier this year, the technology is not economically sound, in part because the TVs cost several thousand dollars and are beyond reach of all but the most affluent consumers, Topol said.

There are economic, political and societal issues that must be resolved before HDTV's launch here, Topol and other conference speakers said.

Tuning in 'telecomputers'

TV manufacturers here are wrestling with the notion of developing a hybrid of TV and computers, which some call "telecomputers," designed to be used with digital video systems. Those HDTV proponents are pushing for modular — or open architecture — TV sets that can be tailored to individual tastes such as personal computers.

Topol said that a TV-computer would not fly with consumers who have traditionally shied away from self-contained, multipurpose appliances. While TV and computers use similar technology, it is doubtful consumers would want one set to "do income tax work and watch NFL football," Topol said.

HDTV is about much more than watching movies at home, speakers at the conference said. One panelist in a session on digital video broadband services and applications suggested dropping HDTV in favor of "high-resolution imaging," which he said "reflects the view that HDTV is more than about television."

HDTV is the "foundation technology" for a wide range of industrial, professional, commercial and educational applications," said Stephen Weinstein, division manager of systems integration research at Bellcore. Nonentertainment applications based on high-quality video are likely to debut well before the first consumers tune in to HDTV broadcasts on big-screen TV sets, he added. "We'll see HDTV on workstations before home TV sets."

The nation's telecommunications carriers are particularly interested in digital video technology because fiber optics will be one of the key delivery systems for HDTV and a whole host of multimedia services still on the drawing board, said Mark Lee, manager of strategic programs development at Northern Telecom, Inc.

ENDEVOR.

The new school in software management.

Some of the biggest fishes in business have graduated. They've outgrown their manual software change procedures and library management systems and moved to ENDEVOR,® the new school in software management. For companies big or small, ENDEVOR helps eliminate the growing pains that come with an expanding software inventory by providing automated and integrated facilities for performing all software management tasks.

Automatically, ENDEVOR audits all change activity, tracks program-component configurations, and enforces standard software processes. It also automates the management of application vendor updates, production turnover, parallel development and software distribution.

ENDEVOR works with emerging technologies, such as CASE generators, LANs, DB2 and CSP, and through its open architecture, ensures full expansion into AD/Cycle—all without disrupting existing library management systems, procedures and structures.

So keep your old school ties, but join the new school in software management. ENDEVOR. For more information, call LEGENT's Software Management Division at 508-870-1900.

LEGENT

© 1990 LEGENT Corporation. ENDEVOR is a registered trademark of LEGENT Corporation. DB2 and AD/Cycle are registered trademarks of International Business Machines Corporation.

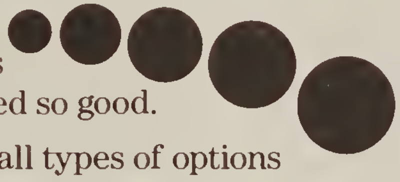
*Suggested U.S. list price. Adobe and PostScript are registered trademarks of Adobe Systems, Inc. in the U.S. and other countries. ©1990 Hewlett-Packard Company PE12023

Introducing the new HP LaserJet IIID printer. The LaserJet printer for handling the high-volume requirements of the multiuser environment.

There's a lot for everyone to like and use. Two paper trays that let users easily switch between different types and sizes of paper. With each tray holding 200 sheets. Which means less reloading. Two-sided printing that allows your users to print their thoughts and reports on both sides of a page. And, if your people would like to say good-bye to feeding envelopes manually, they can—it's done automatically by our optional envelope feeder accessory.

EWS
Having your cake and eating it, too.

Thanks to the same Resolution Enhancement technology found in the LaserJet III, dot sizes actually vary. So curves really curve. Lines are never jagged. And you get resolution never before seen in a 300 dpi printer. Output has never looked so good.



Of course, all types of options are available for all types of users. They can customize with Adobe® PostScript® software. Add memory. Or better express themselves with our MasterType library of fonts and typefaces. Even connect a Macintosh.

What *you'll* like is the reliability and service you've come to expect from Hewlett-Packard. And that the LaserJet IIID is available for only $3,595.* So call **1-800-752-0900, Ext. 1592** for more information on the new HP LaserJet IIID.

HEWLETT
PACKARD

EDITORIAL

Self-justification

NO MATTER WHAT your business, no matter what your industry, ask yourself this question: Do you believe that the margins in your company will increase during the next 10 years?

That's what author, lecturer and information systems guru Peter Keen asked of the crowd at last week's annual *Computerworld Premier 100* awards dinner. Not a single hand went up.

He then said, "Raise your hand if you believe your company will *not*, in the next decade, be involved in a merger, acquisition or major reorganization." Again, not a single hand went up.

The obvious conclusion? We are in a period of tremendous change and uncertainty in which prosperity across the board will be viewed as a phenomenon of the 1980s. And in the midst of this angst-filled era, the capital requests of IS management in corporate America are consuming *50% of all capital outlays*, according to Keen.

Is it any wonder that the understanding gap, addressed on the opposite page by a former chief information officer, Ron Brzezinski, has reemerged as an issue? Here we have IS soaking up huge amounts of money which, if it weren't spent, could drop to the bottom line. And if these outlays aren't going to increase margins — the lifeblood of U.S. business — then why spend so much?

The cost-justification process is getting even more complex, as Brzezinski explains. Formerly, the IS manager had to educate the chief executive officer about the value of mainframes, shortening project life cycles and other fairly tangible items.

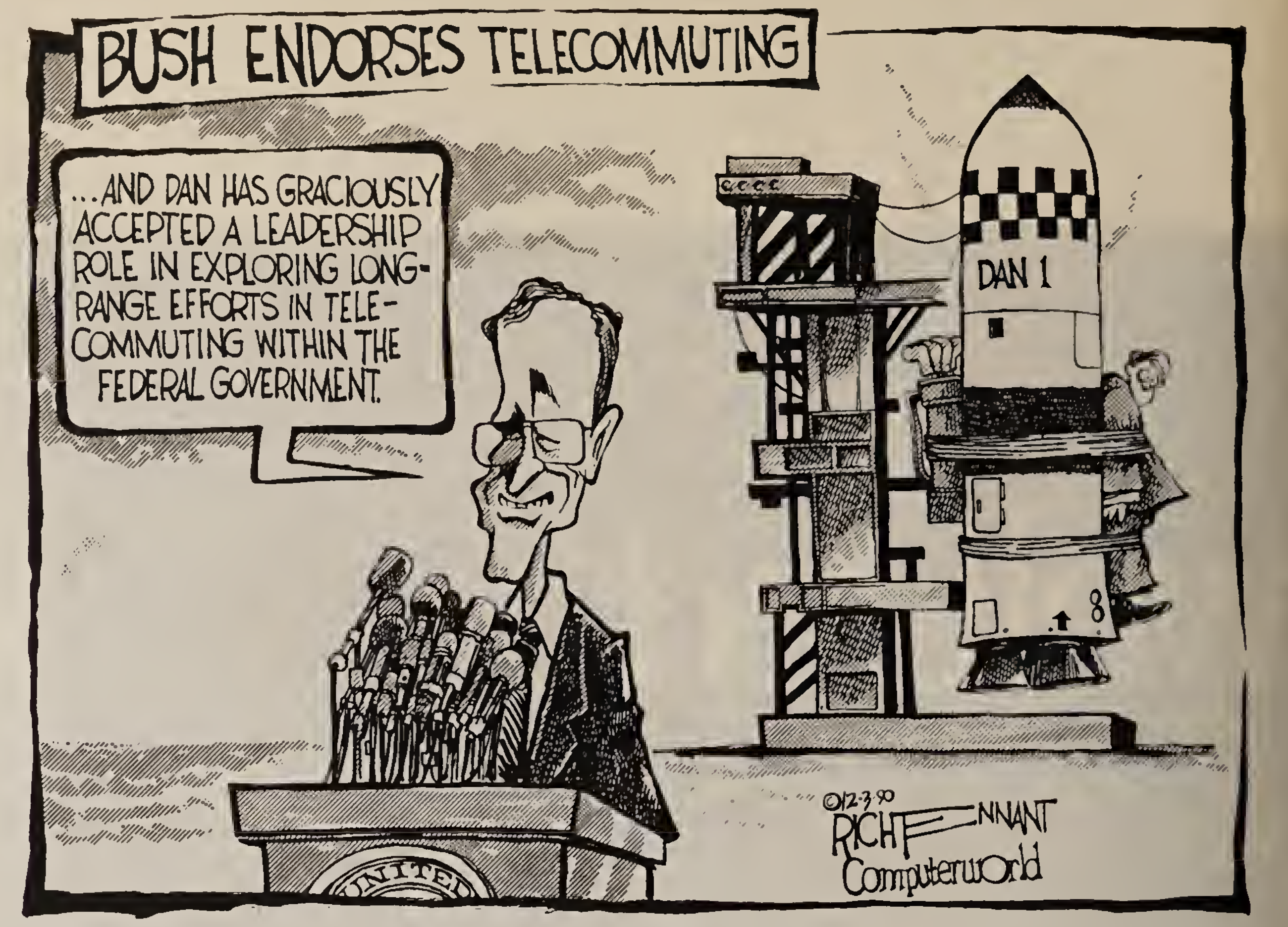
But in today's technology environment, the justification pertains to fuzzier items such as enterprise networks to foster work-group productivity (try that one on the CEO). Meanwhile, the CEO picks up the *Harvard Business Review* and reads the words of Max Hopper, head of IS at American Airlines, who writes that the era of using IS for competitive advantage is, for all practical purposes, past.

Whew. Nice things to consider as you're preparing those capital expenditure requests.

Keen and Brzezinski, as well as many other veteran IS watchers, do agree that only dialogue can save what at times could be a wholesale gutting of IS, with Brzezinski arguing that two out of every five of a CIO's work hours should be spent essentially explaining what he's doing.

For Keen, the task is even more daunting. Somehow the CIO must change the CEO's mindset from thinking of the IS investment as overhead to something far more strategic.

Ultimately, the CEO is asked to take a great leap of faith into an area that will likely always remain far beyond his ken. As with any other act of faith, the bottom line is trust in someone else, trust built on a record of forthright communication. That is why Brzezinski's suggestion that you spend as much as 40% of your time validating your existence deserves serious consideration.


BUSH ENDORSES TELECOMMUTING
...AND DAN HAS GRACIOUSLY ACCEPTED A LEADERSHIP ROLE IN EXPLORING LONG-RANGE EFFORTS IN TELECOMMUTING WITHIN THE FEDERAL GOVERNMENT.
DAN 1
UNITED
©12-3-90 RICH TENNANT Computerworld

LETTERS TO THE EDITOR

Eye on standards

Jeff Angus' article on standards [CW, Oct. 29] is nonsense. His central thesis is that standards enforce some sort of mediocre mean, but the concept of a mean value has no meaning for most of the issues dealt with by standards. How do you calculate the mean of a graphical user interface standard or of a communications protocol?

Without interface standards, systems cannot communicate with systems, and there will be no chance for synergistic leverage as the number of systems increases in this post-Babel world. Instead, creativity will be slowly strangled by the sheer effort of moving data around.

Standards are not the easy option; they have to be enforced because the easy option is rarely the best option. Abandoning standards is just another example of the short-sighted, short-term focus that has become fashionable in the last decade.

If Mr. Angus wants an educational metaphor for standards-setting, then the appropriate one is that of an examination with a failing grade for those efforts that don't shape up.

Andrew Raybould
Jersey City, N.J.

Abort...

In regards to your article "Abort, retry, ignore — truth about the PC age" [CW, Nov. 5] there is a solution to your problem of finding what seems to be a user-friendly computer: Apple Computer, Inc.'s Macintosh.

IBM vs. Mac — Insert a raw disk into an IBM-compatible personal computer and the system will grind confusingly to a halt and produce the message "Abort, Retry, Fail?"

Insert a raw disk into a Mac, and lo and behold, it will understand: "Hmmm. This disk isn't initialized. Do you want me to initialize it for you and then verify it?"

MIS: Macintosh Interface Superiority. Get the hint?

Brian Marantz
Project Manager, Mac EIS
Fluor Daniel, Inc.
Irvine, Calif.

Retry...

Glenn Rifkin's "Abort, retry, ignore — truth about the PC age" [CW, Nov. 5] is probably more on target than the industry wants to admit.

It has been my experience that while there are selected individuals who could be classified as "power users," the vast majority of personal computer users know how to turn it on and run their application well and have some minimal knowledge of two to three other PC applications. "Their application" may be a PC database application or financial projections in a spreadsheet, but beyond that, most PC users are not proficient in multiple applications.

Pick up any set of manuals for spreadsheet or word processing software and you will likely be faced with at least four inches of documentation. The truth is that there are immense amounts of information to be consumed in each application. Most people are consumed with the real work of their day-to-day jobs and do not have the time to learn how to manipulate their application software. Rifkin's "PC maverick" and information center staffs learn through the experience of helping others; their work is to learn the applications. They are not geniuses; it is just their job.

The world is comprised mostly of Glenn Rifkins and, unfortunately, the marketing hype about user friendliness far exceeds reality.

The PC industry is a long way from providing ease of use that matches that of a TV remote control.

Ray Thomas
D/FW Computer Alliance
Fort Worth, Texas

Ignore

I was amused by Glenn Rifkin's comments on the novice's approach to the personal computer [CW, Nov. 5]. Maybe five or six years ago they would have been novel or cute enough to warrant inclusion in *Computerworld.* Just what small dark corner of the "Information Age" has he been documenting?

Is he really trying to tell us that IBM JCL is easier to learn than PC DOS? That a System/38 has a friendlier user interface than a PC?

Stick with Donna Reed, Glenn. It's no surprise to me that you escape to the television.

Thorne Perry
Lake Bluff, Ill.

Computerworld *welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor In Chief,* Computerworld, *P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701. Fax number: (508) 875-8931; MCI Mail:* COMPUTERWORLD. *Please include a phone number for verification.*

Plug the understanding gap

RON BRZEZINSKI

"What do you feel is the key barrier to the chief information officer's success?" Coopers & Lybrand recently posed this question to 200 chief executive officers and chief financial officers. Their answer: Lack of peer understanding of the information systems department's mission.

Just when we thought that senior executives were in tune with the IS department, the understanding gap is returning. Senior management's comfort with information technology and understanding of how it benefits the business may be returning to 1970s levels.

New questions are being asked of the CIOs, such as, "What is network computing? Why are you spending so much on something called CASE? What is information re-engineering all about?"

As technology becomes more embedded in the business processes, senior management must have answers, understanding, knowledge and the confidence to "partner" with the CIO in finding ways to exploit, apply, sponsor and fund new technologies to benefit the business.

IS executives have worked for 30 years to close the understanding gap between business and technology. The gap was almost closed in the late 1980s, after the introduction of the personal computer. For a short time, the CIO's purpose and function had gained peer acceptance in the organization.

The gap now appears to be widening again because the rate of technological change is increasing faster than nontechnical management's ability to keep up. Robert Allen, AT&T's CEO, once said, "Open a piece of optic fiber and see a slice of America going about its business."

Allen's statement illustrates how dramatically information technology impacts business, education, entertainment and all aspects of our lives. CIOs who have lived through understanding gaps know that it is essential to concentrate on closing the gap again.

CIOs are facing a new challenge in attempting to restructure business processes using new information technologies.

Restructuring is a complex task, and large systems integration projects touch all functions of the business. Organizational change and customer and vendor relationships require senior and peer management "sponsorship." Senior management's understanding of how and when technology should be used in the business is key to the CIO's success.

This is not a rehash of 5-year-old issues. Although the message is essentially the same, the reasons and the potential solutions are different.

Beata Szpura

In the past, we educated senior management about information technology to help explain growing budgets, project delays and changing mainframes. These subjects are generally well understood by senior management today. The new questions about networks, computer-aided software engineering, outsourcing and continuing technological change present new challenges.

Countless articles have appeared in the general business press during the past five years about the impact of technology on business. These articles raise the awareness level of senior management, but they also contribute to widening the understanding gap. The new technologies are explained in excruciating detail, but the business benefits require the CIO's interpretation and explanation.

What can be done? Suggestions for the CIO include the following:

- **Awareness** — Look around your company and see if the understanding gap is beginning to widen. The signs center on the types of questions being asked. What articles are of interest and how often are technology explanations required when discussing budgets, service levels and new projects?
- **Time allocation** — The CIO must invest significant personal time with peers and senior management to ensure that peers and senior management will be prepared and comfortable with the subject when it is time to "champion" the next technology wave. In general, less than 20% of the CIO's time is spent with other managers and senior executives. The CIO should begin to spend between 30% and 40% of his time with his business peers to prevent an understanding gap.
- **Themes** — One approach to help close the gap is to identify a "program theme" that can help explain the IS department's objectives and accomplishments for a two-year horizon. Themes help provide common reference points in our rapidly changing world.
- **Validation** — Continual monitoring of peer management's understanding and expectations is required. This is the key reason for allotting 30% to 40% of the CIO's time. Informal, one-on-one meetings will help ensure that peer understanding and support are in place when needed.

Brzezinski is a senior vice president at Coopers & Lybrand in New York.

4GL vs. 3GL: A debate rages without meaning

KEITH HOWARD

Does anyone know a good veterinarian? One who will take the colicky fourth-generation language (4GL) vs. third-generation language (3GL) debate and mercifully put it to sleep?

This is a perennial sneer campaign involving the vendors of 4GLs, whose marketing people were smart enough to seize a nomenclature that implies an evolutionary step in programming technology beyond their allegedly extinct ancestors, vs. the 3GL manufacturers, who insist that unless you write every last line of code yourself, your application will run like a dog. You will, they say, have burned the boat that could have carried you to the promised land of open systems. Who is right, and who is wrong?

The first point to recognize about this debate is that it's not a legitimate debate at all.

It's like comparing a bus with a submarine and expending too much energy wrangling over which is the better vehicle.

Counter-evolutionary

The confusion stems from the term 4GL itself. The term 4GL has created a misconception that these products represent an evolutionary stage beyond 3GLs. After all, 4GLs are *written* in 3GLs so the conclusion is obvious. Are we to believe that 5GLs, whatever they might be, will be written in 4GLs? I'll bet the ranch they won't be. To unmuddy the waters, we have to start calling things by their proper names.

A 3GL is a full-service programming language offering its own unique level and style of abstraction of data and instruction constructs. It is customized to service a specific niche in the data processing marketplace. C is customized to be a portable assembler, while Cobol is the programming *lingua franca* of business applications. Cobol's data types are tuned for people who balance their checkbooks in decimal, not hexadecimal.

A 4GL, on the other hand, is a partially built, tunable application. The user-tunable portions (I/O screens, data layout) try to be everything to as many applications as users commonly build. The elasticity of the tuning range is the limiting factor. For some users, that range may be sufficient; for others, it may not be.

4GLs also differ from 3GLs in that most of the major 4GL products ride on top of a relational database. They are expressly designed to front end such data repositories. Their affinity to relational database technology, in fact, is as cozy as SQL's. There's one difference worth noting, however: I haven't heard of anyone predicting that SQL will replace Fortran.

Some 4GL vendors now provide gateways to nonrelational repositories, and others are broadening their reach by offering the capability to call 3GL modules. 3GLs counter by supporting embedded SQL calls to access relational databases.

SQL is a language in its own right, and blending its syntactic style with the control and data constructs of a host language does require some effort. Nevertheless, SQL enhances a 3GL by giving it the capability to execute multiple row updates, freeing it from its procedural one-record-at-a-time processing heritage.

A 4GL, on the other hand, can never become a 3GL, no matter how many gateways and hooks it provides. The underlying nature of the product is materially different.

Different families

Once we acknowledge that 4GLs and 3GLs are not from the same gene pool, we can end the senseless battering and examine the strengths that each product offers and how they might be combined to create a better tool.

The future portends the combination of the flexibility of general-purpose programming languages with ready-made high-level service modules (screen protocols and persistent storage facilities) that can be configured in any way the user pleases. This, of course, is the object-oriented approach. The libraries of ready-made service modules or classes will be interoperable across different programming languages if the promise of open object orientation is truly fulfilled.

In the meantime, the 4GL vs. 3GL debate needs to be put to bed. Different beds. There's no litmus test that will unequivocally tell you which approach is right and will continue to be right for years ahead. If your application needs are not complex and you like to use your computer like a household appliance, then a partially built application with some tuning knobs will likely suffice.

If, on the other hand, you anticipate that new applications will spring up once you have captured the corporate data and you want the flexibility to embrace new technologies as they evolve, then you'd be better off selecting a 3GL. You can then evaluate software products and mix and match them with the 3GL as your application demands grow.

It is a frustrating reality of the computer industry that if you want the best application development tool, you should come back in 10 years.

Howard has been working in software and commercial product development for almost 20 years. He currently lives in San Francisco.

STRATEGIC SOFTWARE SOLUTIONS.

THE FUTURE IS STERLING

KEY BUILDING BLOCKS OF ENTERPRISE-WIDE COMPUTING.

Our strategic initiatives automate critical elements of your enterprise-wide computing environment:

Data communications: Integrated data communications for reliable data transmission and electronic data transfer across multiple protocols and among multiple platforms, from PCs to minis to mainframes.

Storage management: An integrated storage management environment that provides tactical solutions, automation of critical functions and compatibility with IBM's system managed storage strategy.

Change control: Automated management of software changes, from the initial design to deployment and ongoing application maintenance and enhancements.

CASE: An enterprise-wide repository supporting mainframe and LAN-based CASE tools which accommodates any methodology used in building the business information model, including the data structure and application logic.

Client/Server: Robust 4GLs providing rapid deployment of client/server applications running on PCs, UNIX platforms, LANs and VAXes, allowing departmental systems to interoperate with corporate data on the mainframe.

Information Management: A comprehensive set of tools for extracting, viewing, manipulating and reporting data from sequential, VSAM, hierarchical and relational databases.

Sterling Software gives you the foundation of enterprise-wide computing. Tools that leverage your existing systems and applications with new technologies. And give you the ability to build your enterprise-wide environment into a strategic business advantage.

For more information, contact Sterling Software.

STERLING SOFTWARE

THE FUTURE IS STERLING.

System Software Group Headquarters, 21050 Vanowen Street, Canoga Park, CA 91304, Phone (818) 716-1616

Answer Systems Division (818) 716-1616 Dylakor Division: (818) 718-8877 International Division. (818) 716-1616
Software Labs Division: (714) 889-2663 Systems Software Marketing Division. (916) 635-5535

COMMENTARY

Johanna Ambrosio

Not-so-open open systems

Unix has been in the news a lot lately. Salomon Brothers and other users have adopted it, and vendors including NCR are betting their companies on it. Still, Unix remains pretty much a sleeper in the commercial sector. And there are several reasons for this beyond the much-talked-about "Unix wars" between competing industry factions.

First, there's no such thing as a truly open system, and there probably won't be in our lifetime. Second, vendors aren't pushing them because of economic factors. Last but not least, users don't want them — at least not right now.

Let's take each point. Today's Unix systems are open all right but only to a certain degree. You can mix and match computers from different vendors, and you can run the application on virtually any size computer you want. Those are both good things, because they allow for much greater flexibility and a more competitive environment, and the information systems manager wins.

But no such openness exists on the software side. Sure you can run the application wherever you want, but you're locked in. Once you've written mission-critical applications in a fourth-generation language

Continued on page 29

U.S. House awaits relief from old IS technology

ON SITE

BY GARY H. ANTHES
CW STAFF

WASHINGTON, D.C. — Linda K. Berdine may be among the few information systems managers who find professional inspiration in the words of Abraham Lincoln.

According to Berdine, Lincoln urged the development of telegraph systems spanning the Atlantic and connecting Washington to the national forts. "Such communications established with any reasonable outlay would be economical as well as effective aids," Berdine quoted the former president as having told Congress in 1861.

Berdine, whose Capitol Hill office contains a number of Lincoln portraits, is looking for similar aids for 6,000 users of an antiquated patchwork of applications that support the missions of the U.S. House of Representatives.

At the heart of the House's information systems is the Member Information Network, which consists of dozens of independent databases on an IBM 3090-400J mainframe running MVS/ESA under CICS. Users access databases written for Software AG's Adabas and IBM's Stairs and VSAM files. Databases include text from the "Congressional Record" and other publications, news wire services, past and current legislation, grants and contracts, committee schedules and hearings, voting records, federal laws, the federal budget, economic and census statistics and much more. The network's 6,000 users typically log some 500,000 interactive sessions per day, Berdine said.

There are about 100 local-area networks on Capitol Hill for the House of Representatives, many of them surrounding Digital Equipment Corp. VAXs and all festooned with dumb terminals, personal computers from IBM and Apple Computer, Inc. and Unix workstations. Most of the LANs reach the mainframe via a campuswide Ethernet backbone.

The applications are hardly user-friendly. Users must individually log on and off of each database, and it is cumbersome to link or combine databases for complex but powerful queries. "We have 80 databases and 10- to 15-year-old technology. It's not fun," Berdine said.

Now, Integrated Systems and Information Services (ISIS) is to replace Member Information Network. ISIS is based on a client/server model in which local office systems become clients to the mainframe-based databases, the information servers.

Requests to the mainframe will flow through Sybase, Inc.'s Sybase SQL Server on Sun Microsystems, Inc. Sun-4/490 servers or Digital Equipment Corp. VAXs to an IBM RT gateway running Sybase Net Gateway, software for connecting

Continued on page 29

D&B plans receivables enhancement

BY SALLY CUSACK
CW STAFF

NATICK, Mass. — Dun & Bradstreet Software has committed to an enhancement for its D&B Accounts Receivable software system and has said that the revised version of the product is scheduled to be available in the first quarter of 1991.

The company has promised that the augmented package will include several items specifically requested by the user community, such as improvements to the product's aging and cash applications as well as several ease-of-use features.

Initially released as Millennium Accounts Receivable software by McCormack & Dodge in 1985, the software runs in IBM DOS/OS and MVS environments. A version that was developed exclusively to run on the Digital Equipment Corp. VAX computer series was released last month.

According to Scott Davey, national chairman of the D&B Software AR:M user group, the customers initially presented their requests to McCormack & Dodge, and after the merger, D&B Software concurred that enhancements to the package were indeed necessary.

"They've done a pretty good job of handling the requests that came through," Davey said, referring to D&B Software's response to user suggestions. He added that the vendor has complied with 70% to 80% of the items presented by the user group at that time.

The most important enhancement for the users, Davey said, is the revised Dynamic Aging portion of the software, whereby the program will identify on an ongoing basis just how much money has actually been collected on aged accounts.

"As the invoices are paid, it will reduce the bucket that the invoice was in," Davey said. An aged account is defined as being between 30 to 60 days in arrears, and the software is designed to allow follow-up on aged account collections.

Other enhancements are said to include reworked portions of system reporting functions in an effort to make them faster and less resource-intensive.

Davey said that the upcoming release follows the usual enhancement request time frame of two years from concept to completion and predicted that the accounts receivable package will eventually work with IBM's DB2, although he said he does not see a large demand for a DB2-compatible version for at least five more years.

the totally automated office

The Next Generation in Office Automation

● *Fully Customizable* ● *Decentralized Administration* ● *Full Connectivity* ● *Integrated PC Support* ● *Resource-efficient*

Emc^2/TAO IS A QUANTUM LEAP FORWARD IN ELECTRONIC MAIL AND OFFICE AUTOMATION.

Emc^2/TAO is a dynamic system that gives Electronic Mail and Office Automation to everyone — from novice to expert. It can be tuned on an individual basis to suit the user's abilities and needs. Novices can start on day one with no training. Experts have everything they need. And, it has been designed as a platform to support an emerging set of capabilities as the evolution of office automation continues.

POWER THROUGH SIMPLICITY

Emc^2/TAO provides hundreds of easy-to-use features for managing, organizing and distributing Electronic Mail and documents. Emc^2/TAO includes electronic-mail, calendaring, document storage and retrieval, and a multitude of powerful bridges and gateways.

Emc^2/TAO gives full control through decentralized administration. Authorization can be delegated by **feature,** by **department** or by logical **class.** And Emc^2/TAO's user interface allows product features to be custom-tailored to suit the needs of each individual user or group of users, at the installation's discretion.

Emc^2/TAO is simple, powerful, and allows unprecedented connectivity.

ALL ENVIRONMENTS

- MVS, MVS/XA
- VM/CMS
- VSE, SSX
- TSO, CICS, IMS, IDMS
- PCs (Personal Emc^2)
- VAP (Special Emc^2 VTAM Application)
- FIVS (Fischer International Virtual System)

GATEWAYS

- PCs and LANs.
- SNADS.
- X.400.
- BITNET.
- DIA/LU 6.2 compatible devices and systems.
- Western Union services: (Telex, Facsimile, EasyLink, etc.)
- DISOSS.
- PROFS.
- DEC (VAX Mail, All-in-One).
- WANG (Wang Office).

And more.

Emc^2® TAO™

ELECTRONIC MAIL COMMUNICATION CENTER / TOTALLY AUTOMATED OFFICE

Emc^2/TAO Is the smart answer.
Many of the largest corporations in the world have already selected Emc^2

CALL NOW for more information. Toll-free: 800 237-4510. In Florida: 813-643-1500.

FISCHER®
INTERNATIONAL
SYSTEMS CORPORATION

The Malcolm Baldrige National Quality Award was established by Congress to recognize those whose pursuit of quality sets the highest standards in American industry.

IBM is proud that its Rochester, Minnesota team, which designs, builds and supports the IBM AS/400® computer system and storage products, is a recipient of this prestigious award.

Thank you.

IBM®

© 1990 IBM Corporation. IBM and AS/400 are registered trademarks of International Business Machines Corporation.

Utility opts for Supra over DB2

BY ROSEMARY HAMILTON
CW STAFF

DES MOINES, Iowa — One of the key reasons that Iowa Power selected Cincom Systems, Inc.'s relational database management system over IBM's DB2 was because it wanted to call the shots, according to Nancy Jacobson, manager of data and security administration.

A second factor was the RDBMS' associated application development tool. Iowa Power wanted to license the two as a package and was not interested in hunting around for the best DB2 third-party tool. The Cincom package of Supra and the application development system Mantis beat out IBM's DB2 and Cross System Product, which Iowa Power found difficult to use.

Although a DB2 choice would have given the company, which is a subsidiary of Midwest Resources, Inc., the benefits of using the leading mainframe RDBMS, it did not have the hardware platform options that Iowa Power wanted left open to it, Jacobson said.

These days, the Cincom system continues to give Iowa Power the flexibility it wants, Jacobson said. The company is currently finishing up the test run on the latest release of Supra, Cincom's RDBMS, which it will move into production early next year. It is also considering bringing in a Supra version for a Digital Equipment Corp. system and has looked at the local-area network version of Supra, which has not been officially released.

What is more, the company continues to run the software on an IBM 3081 mainframe. When it reviewed DB2, IBM had recommended both a hardware and operating system upgrade to better accommodate the RDBMS, Jacobson said. Iowa Power was not interested in moving up to a 3090 and the ESA version of MVS.

"The plus is the flexibility," Jacobson said. "We can state our own direction. DB2 has a corner on the market, but we felt we'd get cornered with it, too. We didn't want to get caught in a hardware trap because of our software choice."

However, Jacobson is also quick to point out that the lack of a thriving third-party market — which provides DB2 users with their choice of tools — continues to be a downside to the Cincom system. Yet, she said, Cincom's stated goal is to make Supra 100% compatible with DB2, which should give the company access to some of the third-party tools. Mantis, she said, gets a thumbs-up from her staff for ease of use. The company has three Mantis-built applications in various stages of development.

"Mantis is easy to install," she said. "I did it myself, and I try not to do techie things."

In addition, support for both the RDBMS and application development tool comes from Cincom, which saves the firm the hassles of dealing with more than one vendor, Jacobson added.

Sierra Group: HP's New Wave for smart shoppers

BY J. A. SAVAGE
CW STAFF

Despite its requirement for more memory, a mouse and two types of personal computer software, Hewlett-Packard Co.'s New Wave application is "a bargain" when used in conjunction with an HP 3000 minicomputer, according to a recent report by The Sierra Group, Inc.

The report, called "Midrange Systems Cost of Ownership," noted that the features of New Wave, such as accessing data from open systems networks, as well as IBM's Professional Office System office automation system and a user-friendly graphical interface, would cost companies $450 per user on a 100-user system. That cost includes a 1M-byte memory upgrade, Microsoft Corp.'s Windows, New Wave software and a mouse.

However, these numbers only account for 10% of users having full capability, including memory and networking, to use all of New Wave's capabilities, The Sierra Group's report said.

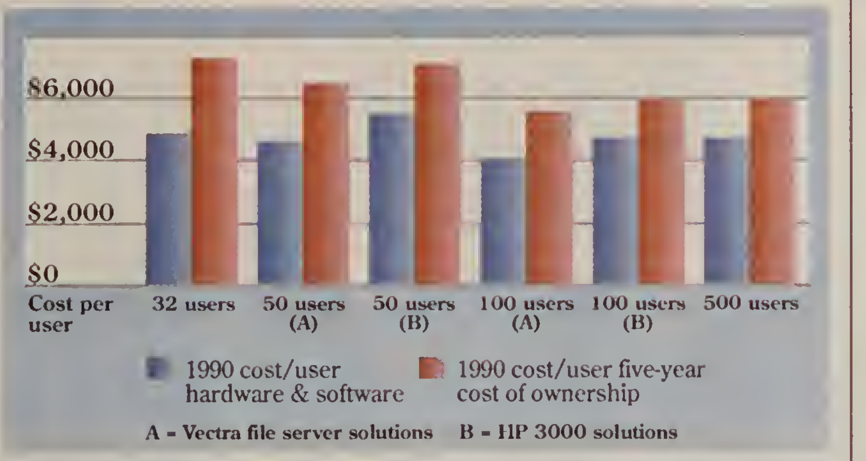
This is the second time in two years that The Sierra Group, a Tempe, Ariz., market consulting firm, has run numbers on HP's New Wave software based on a client/server configuration.

The study noted that although only 10% of users would be set up to fully use New Wave, HP was not low-balling configurations to achieve a better cost of ownership. "Due in large part to a significant increase in the workstation and PC requirements for client/server configurations . . . HP's PC-based server configurations are somewhat more expensive. However, most of the HP configurations are less expensive this year, even with the more robust workstations specifications," because of price sensitivity at the minicomputer or server level.

The study noted that the cost of peripherals has "increased . . . as a percentage of overall costs" for systems between eight and 32 users.

Smooth road

Hewlett-Packard has established a realistic growth path for migration from PC-based to minicomputer networks, according to Sierra Group research



Source: The Sierra Group

CW Chart: Doreen St. John

Users test Decbank tool

BY JOHANNA AMBROSIO
CW STAFF

NEW YORK — Remote management and isolation of users from data processing "mumbo jumbo" are key features cited by early users of Digital Equipment Corp.'s integrated family of software and services products for banks, which was announced two weeks ago.

Called Decbank, the family encompasses DEC hardware and communications products and adds integration software and a customizable end-user interface. The integration layer allows banks to plug in their existing applications and bank-specific devices such as statement printers.

Decbank also links with a dozen or so existing off-the-shelf packages from third-party vendors. These packages range from teller applications to software for loan processing and management reporting.

"Decbank is a deliverable piece of software that allows banks to incorporate third-party applications, distribute data and incorporate a standard client/server architecture," said Bob Russell, vice president of Digital Services Industries. "We've been delivering this in pieces, but Decbank ties it all together."

The banking industry is DEC's fastest-growing market, with annual growth rates of more than 20%, Russell said. This year, DEC will earn approximately $1.2 billion in revenue from this sector, he added.

Decbank, which runs under VMS, incorporates existing DEC communications products such as Network Applications System and Decnet and links to other vendors' computers. Decbank uses DEC's relational database, RDB.

A Chemical bond

Chemical Banking Corp. in New York has positioned Decbank as the server component of its three-tier architecture. Decbank allows workstations in approximately 80 Chemical Bank branches to link to the bank's mainframes, according to James H. Kelley, vice president and group head of Chemical's information and technology services.

"We use Decbank as a giant server — for database, print, local-area network" and other types of functions, Kelley said. "It insulates the person in the branch from all the mumbo jumbo that data processing has created over the past 20 years."

Another Decbank user is Ameritrust Corp. in Cleveland. Robert C. Salipante, executive vice president of the Banking Services Group, said his organization will have Decbank in 100 branches by February.

"We've been able to integrate our existing teller machines and do remote management of them, something we could not do before," he said. Another plus is using standard computer paper to print forms instead of having to buy preprinted forms, he added.

First LAN-based EIS released last week

BY SALLY CUSACK
CW STAFF

WALTHAM, Mass. — An executive information system (EIS), claimed to be the first entirely based on local-area network topology, was unveiled last week by Information Resources, Inc.

Called Express/EIS, the system runs on a personal computer or a LAN, the vendor said, and data can also reside on a mainframe or minicomputer platform.

According to Steve Rubinow, director of decision support services at The Quaker Oats Co. in Chicago, the company has been beta-testing the software for approximately three months in an IBM environment.

"We want to be able to tie into many of the data sources around the company in real time, while integrating existing software applications into the EIS," Rubinow said.

Quaker Oats is running the front end using IBM Personal System/2s under DOS, which communicate with an IBM 3090-600 mainframe over Novell, Inc.'s Novell token-ring.

Rubinow anticipated that between 50 and 60 corporate executives will be accessing the system when it is fully operational. The firm is currently working to tie in-house-developed software, such as performance analysis and sales applications packages, into the EIS and is running certain program components on approximately 50 PCs scattered throughout the company.

The product incorporates a set of decision support software tools designed to allow users to work with a variety of data sources to track, analyze and respond to critical issues.

An Information Resources customer since 1987, Quaker Oats also uses the vendor's Express software system for applications development.

The Express/EIS requires an Intel Corp. 80386-based platform with 4M bytes of memory, and a 5M- to 10M-byte disk on each additional PC residing on the LAN.

In addition to the PC LAN-based environment, the software also operates several other architectures, including IBM MVS and VM, Digital Equipment Corp. VAX/VMS, Hewlett-Packard Co. MPE/XL and Prime Computer, Inc. Primos.

LAN support includes Novell, 3Com Corp., IBM Token-Ring, Ethernet, Systems Network Architecture, bisynchronous, asynchronous and Banyan Systems, Inc. Virtual Networking Software.

Pricing starts at $50,000, depending on system configuration and CPUs.

Express/EIS is currently available.

IS helps juvenile system

Wang 7150 allows courts to deal with increasing caseloads

ON SITE

BY SALLY CUSACK
CW STAFF

NEW YORK — Soaring juvenile crime rates across the country are keeping court administrators, caseworkers and law enforcement officials working double duty to keep up with rapidly increasing caseloads.

To combat the ever-growing onslaught of data coordination and reporting requirements, the city of New York's Juvenile Justice Information Services (JJIS) division is working constantly to improve system services for its end users.

"If I have computer downtime, a kid who should be in jail could be on the streets," said Barry B. Edison, director of JJIS.

The department is responsible for servicing the computer information needs of all the New York boroughs. It currently relies on a Wang Laboratories, Inc. VS 7150 minicomputer as the hardware hub of its informational wheel.

The JJIS must track information from the point at which a child enters probation through sentencing completion. Relevant data and required documentation must be coordinated with client history profiles, and absolute privacy must be guaranteed under the laws protecting juvenile defendants. The system also maintains all family-related court counsel information and tracks data on periods of actual detention.

> "IF I HAVE computer downtime, a kid who should be in jail could be on the streets."
>
> BARRY B. EDISON
> JJIS

The organization's two main applications — corporation counsel and probation — were tailored from a case management system developed by Inslaw, Inc., a company based in Washington, D.C. According to Edison, the JJIS leased two versions of the Inslaw Promis tracking system software and customized it to serve the needs particular to the JJIS and its client agencies.

Databases from the various software systems can be merged, Edison said, but due to the delicate nature of the data, this can be done only if special authorization is given.

Because a juvenile's right to privacy is so strictly protected on federal, state and local government levels, all hard copy is shredded after output, and other information is kept sealed. The JJIS data center is littered with piles of large, transparent plastic bags stuffed with shredded reports.

"We produce tremendous amounts of reports for our user agencies, ranging from one to thousands of pages, on both a weekly and monthly basis," Edison said. JJIS compiles requests from the police department, the district attorney's office, the department of probation and other government agencies.

The computer system itself uses a combination of Wang security and software security developed in-house, and it implements extensive, layered audit-trail facilities.

JJIS supports approximately 120 terminals across the city, with approximately 40 of those doubling as personal computers, Edison said.

In addition to the VS 7150 at headquarters, the department also uses a smaller Wang VS-6E to facilitate local-site data and word processing functions in the Bronx Family Court. The VS-6E also communicates with the 7150 for general-purpose data processing and reporting.

Edison and his staff are busy linking computers together these days. The office is installing a Wang VS 5000 in the Queens Family Court and a VS-6 in the Manhattan Family Court.

"It's great having the minis out there," Edison said. "It reduces the number of phone lines coming in here, and each division can maintain independent word processing operations." The JJIS is replacing its multichannel service units with direct-dial lines, and the department depends on Wang's WSN protocol for both direct-transfer and point-to-point communications.

Describing the Wang computers as "good, solid equipment," Edison said JJIS has also worked with systems from Digital Equipment Corp. and Prime Computer, Inc. and that he finds the VS line to be the "easiest to maintain and operate." He also added that the department is thinking of imaging as a possible vehicle for data entry and hopes to someday upgrade to the top-of-the-line Wang 10000.

And while the system protects the rights of juveniles, its communication and tracking capabilities also serve to protect the general population, Edison said.

"If a kid commits a crime in Manhattan on Monday, is bailed out and is picked up for performing another crime on Tuesday, we know. That information is entered immediately for access and used by the agencies we serve," Edison said.

PLATINUM Takes The

LT. COL. JOHN PAUL STAPP DURING HIS HISTORIC HIGH SPEED ROCKET PROPELLED SLED RUN. HOLLOMAN AIR FORCE BASE, DECEMBER, 1954

Is DB2™ causing you this kind of pressure?

As you confront the challenges of relational technology, are you being stressed by intimidating deadlines and unending demands for new applications?

And whether you're a DB2 novice or a veteran of many years, are you still struggling with DB2's complexity to accomplish even the most basic tasks?

That's where we come in...to relieve your DB2 stress like no other company can.

DB2 may be new to you, but it's not new to us. We're PLATINUM *technology, inc.*, the only full service software company specializing exclusively in DB2.

From our beginnings, PLATINUM's energies have been focused on delivering quality solutions that make DB2 easier to understand and simpler to use. We have created a complete line of products and services to make DB2 more productive for you and to make learning DB2 a lot less stressful for everyone.

Corporate Headquarters 555 Waters Edge Drive, Lombard, IL 60148 (708) 620-5000 FAX (708) 953-1923 US (800) 442-6861 Canada (800) 848-0140
Corporate Sales Offices Houston, TX (713) 894-4500 Los Angeles, CA (La Mirada) (213) 926-5544 New York, NY (212) 564-7300 Sacramento, CA (916) 489-1464 Waterbury, CT (203) 756-3000
Domestic Affiliates Boston, MA (617) 451-0900 Chicago, IL (Schaumburg) (708) 303-0445 Cleveland, OH (Mayfield Village) (216) 646-1529 Dallas, TX (214) 620-9001 Detroit, MI (Southfield) (313) 354-5504
Hartford, CT (Glastonbury) (203) 633-4646 Milwaukee, WI (Brookfield) (414) 797-8859 Minneapolis, MN (612) 335-3660 Portland, OR (Wilsonville) (503) 682-4532 Washington, DC (Reston, VA) (703) 620-6500
International Affiliates North Sydney Australia 61 2 9573755 Vienna, Austria 43/222/53 36 899 Copenhagen, Denmark 45-39 271120 Northhampton, England 44 604790959 Espoo, Finland 358 0 80 39 011
Paris, France 33 (1) 49 59 63.63 Tel Aviv, Israel 972 3 5622833 Milan, Italy (02)-21.57.851 Utrecht, The Netherlands 31 3 031-3048 Madrid, Spain 34 1 4 11 51 99 Geneva, Switzerland 41 22.48 50.00
Zurich, Switzerland 41 41 66 58 00 Dusseldorf, West Germany 49/211/223028

IBM is a registered trademark and DB2, OMF and CSP are trademarks of International Business Machines Corporation

Ambrosio

CONTINUED FROM PAGE 25

(4GL) or you begin to use a certain database management system, that's it. You're locked into that DBMS or 4GL. It doesn't matter whether the operating system is DOS, Unix, MVS or something that hasn't been invented yet. One cannot change these decisions without a major migration effort, and the promise of open systems does not yet include this ability.

Many factors work against this truly open environment ever becoming a reality. There is no economic advantage for vendors to provide this, because they will have a dickens of a time differentiating their wares. This is already happening, and that's why virtually every vendor that supports Unix will have a different version.

Not only will the operating system be tuned to their particular hardware, but the version offered by each vendor will be different enough to make switching to another Unix version a decision that most IS folks will want to think about. Even though the versions will be "compatible," there will almost certainly be tweaking required by users. And as we all know in the software world, it's the little things that can kill you.

On the user side, I don't know many IS shops that really want to change their mission-critical systems all that often. The freedom to do this might be nice, if for no other reason than to hold it as a threat over the head of an uncooperative vendor. However, the reality remains that software acquisition is a decision that is not made lightly. Committees are formed, permission sought from top executives and budget constraints worked out. It is a lengthy, exhaustive process.

Implementing software is even less easy — especially given that with most large applications, there is a healthy degree of customization. What you wind up with is a hybrid of off-the-shelf and homegrown software, and most users would not want to go through this any more than they absolutely have to.

So, to paraphrase Gertrude Stein, an operating system is an operating system. Most users look at Unix as just another operating system to deal with, and unless they have a specific application for Unix, they will wait. And we all know how plentiful commercial Unix applications are.

Then, too, there are the political implications for users. Cynics say that most IS shops naturally fight the move to open systems because the need for IS "priests" would be lessened, as would the political clout of IS. A lot of IS executives will dispute this by saying that the move to personal computers — open systems of sorts — has proved how needed IS is after all. And more than one IS manager has said that the move to open systems has made him or her a hero because of the flexibility these systems provide.

Still, I find it interesting that a quarter of a century after the advent of computing, we're moving from a hardware-dependent industry to a software-dependent one. I don't know how long it will take to achieve total independence, but without more users pushing for it, we may never know.

Ambrosio is *Computerworld's* Mid-Atlantic senior correspondent.

U.S. House

CONTINUED FROM PAGE 25

Transmission Control Protocol/Internet Protocol to Systems Network Architecture LU6.2 and for mapping client requests to CICS transactions. The requests then go to Sybase's Open Server for CICS on the mainframe, which processes them, retrieving data and sending the results back downstream.

The ability to easily retrieve information from different types of files and databases and move it to different types of systems will be the magic of ISIS, according to database administrator James Daly. "What makes it all work for us are the net gateway products [on the RT and mainframe] that open up the mainframe to all these different client platforms."

The two Sybase products allow the House to avoid much of the cost of rewriting applications and converting files and databases, Daly said. "It allows us to use technology that spans many years. And it allows us to have nice [graphical user interfaces] on the Macs while leaving the old mainframe front ends unchanged."

Windowing and the ability to link the databases will give users enormous new powers, Berdine said. "Members' press secretaries sometimes have to put together speeches in minutes. Now they'll be able to click on pieces of a bill and move them into a speech."

ISIS consists of logical bundles of applications that Berdine calls "workbenches": one each for the executive, legislative, constituent, press and analytical functions. Two applications in the executive workbench will be operational next month, and all of ISIS is due for completion in 1993.

Berdine would not say what ISIS will cost, but she said she is keeping costs down by using much off-the-shelf software and relying entirely on her own staff of 240 programmers and analysts.

Berdine said the House is becoming hungry for technology, even for the rather cumbersome tools offered by the existing MIN system.

"We had 560 people logged onto the system on election night. Two years ago, everyone used to telephone us for information," she said.

Stress Out Of DB2

PLATINUM offers all these administration, development, and end user software products for the perfect antidote to DB2 stress.

- RC/QUERY™
- RC/UPDATE™
- RC/MIGRATOR™
- RC/SECURE™
- PLATINUM Database Analyzer™
- PLATINUM Report Facility™
- PLATINUM Plan Analyzer™
- PLATINUM Data Compressor™
- PLATINUM Rapid Reorg™
- PLATINUM Pipeline™ for DB2

PLATINUM's hands-on training courses cover all aspects of DB2, QMF, and CSP. All courses are available either at your facility or at one of our regional education centers.

- Introduction to DB2
- DB2 Database Design and Application Planning
- DB2 Database and System Administration
- DB2/SQL Application Programming
- CSP Application Programming
- Using DB2 and QMF

Our guides and reference manuals contain the most recognized and authoritative standards and guidelines for DB2.

- The PLATINUM DB2 Guide/Online™
- The PLATINUM Reference™ for DB2
- The PLATINUM DB2 Catalog Poster

All of our products and services carry the PLATINUM Quality Assurance Guarantee. Toll-free phone support is available 24 hours a day, seven days a week.

So if DB2 has taken you to your limit, why struggle any longer? Call PLATINUM *technology* at **1-800-442-6861** for more information, an in-house demonstration, or our exclusive no-obligation product evaluation.

PLATINUM technology
The DB2 Company™

Pt PLATINUM

IBM Business Partner

FOUNDING MEMBER INTERNATIONAL DB2 USERS GROUP

The 486™ PC. It may be a little

486™ Never before has this much power been plugged into a business PC.

Presenting the Intel 486 microprocessor—a veritable powerhouse that's been harnessed for business.

A 486 microprocessor-based PC has everything it takes to run today's high-powered applications. And run them the way you need to—simultaneously and at lightning speed.

Plus, it's compatible with the hard-

©1990 Intel Corporation.

more power than you're used to.

ware and business applications you already own, so you won't spend any extra time or money on training.

The 486 PC. Plug it in and start shocking the corporate world.

For additional information, call 1-800-548-4725 and ask for "The 486 Microprocessor Means Business" brochure.

intel®

The Computer Inside.™

486 is a trademark of Intel Corporation.

Ingres gateway product attracted Ask

BY JEAN S. BOZMAN
CW STAFF

MOUNTAIN VIEW, Calif. — When Ask Computer Systems, Inc. acquired Ingres Corp. in October, it gained several key technical tools to be used in Ask's next-generation application software products.

Prime among these are the Ingres "gateway" products and Ingres tools that, when used in combination, will link Ask applications on Unix, Digital Equipment Corp. and Hewlett-Packard Co. computers with corporate databases running on IBM mainframes.

"Ask didn't pay all that money just to protect the Ingres database engine on which they're basing their new products," said the president of Chicago-based Performance Computing, Inc., Rich Finkelstein, who is evaluating the Ingres gateways. "They are looking for a way to expand their business, and Ingres' fourth-generation language tools are extremely good, state-of-the-art technology."

So far, the Ask/Ingres gateways link Ask/Ingres applications to DEC's RMS and RDB databases and to IBM's IMS and DB2 databases. However, more gateways are on the way, including one for Tandem Computers, Inc.'s Nonstop SQL database, Ask Chief Executive Officer Sandra Kurtzig said.

Ingres' gateway products, officially announced in October, have been used at beta-test sites for 10 months. Used in conjunction with Ingres tools and the Ingres/Star and Ingres/Net networking products, the gateways push Ask applications, developed with Ingres tools, into mixed-vendor environments.

One part of the Ingres gateway resides on a DEC computer or a Unix machine, while the other resides on the IBM mainframe. According to Ask, users do not need to run an Ingres database management system to use the gateway product; they only need to write the application using Ingres tools.

An Ingres demonstration shows that the mapping to DB2 is so complete that IBM's DB2 error messages appear on the Unix or DEC user's screen. That kind of functionality, analysts said, appears to be unique among the gateways offered by DBMS vendors.

Still questions

"There are major performance issues to be faced," Finkelstein said. "You can use these gateways to access remote databases, but I'm interested in seeing how these products work in user sites, handling large and complex transactions."

Until the new gateway products are widely deployed, however, some analysts question the range of functionality in the Ingres gateway code. "A gateway product can always translate SQL into a series of commands that would update an IMS database. The question is: Will they work efficiently?" asked Herb Edelstein, a partner at Euclid Associates, Inc. in Berkeley, Calif.

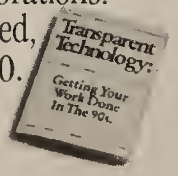
ICI Pharmaceuticals Group in Wilmington, Del., has been using an Ingres Gateway since September. The gateway is used in a production application linking a DEC Vaxcluster to an IBM 3090 Model 600 mainframe running DB2.

The ICI application allows users to create ad hoc queries from DEC terminals and run them against sales data stored under the DB2 relational DBMS. Other vendors' gateway products can query DB2 for information, but most of these products, with the exception of Sybase, Inc.'s DB2 gateway, cannot do so in real time.

"We had been displeased with the kind of development tools available for DB2. Now, we're able to leverage our Ingres expertise to run real-time queries against the corporate sales database," said Aidan Farrell, manager of technology development at the ICI unit. Previously, batch updates to the IBM mainframe had limited ICI users' database queries to preprogrammed formal reports.

After Trying Our Business Software, American Tourister® Sent The Others Packing.

It was an open and shut case. Only our *Financial, Human Resources* and *Environmental Management* software for the IBM AS/400 provides you with the mainframe functionality and PC ease-of-use necessary to let you get more work done.
That's why our midrange solutions are being chosen by more and more Fortune 1000 corporations.
Free White Paper Offer: For more information and a free copy of a white paper entitled, "Transparent Technology: Getting *Your* Work Done In The 90s," call 1-800-388-2000.



Software 2000
The Difference Is Expertise.

ATLANTA • BOSTON • CHICAGO • LOS ANGELES • LIMERICK • LONDON

1800 Series Concept Collection from American Tourister IBM and AS/400 are registered trademarks of International Business Machines Corporation.

IDC WHITE PAPER

Information Systems: The Next 10 Years

11,250,000

WE'RE RESEARCHING THIS NUMBER DAILY.

Each working day of the year, Hitachi, Ltd. invests over $11 million in research and development alone. Some 60% of this figure is related to information technology. Including the technology of Hitachi Data Systems, which draws from the Hitachi, Ltd. staff of 16,000 employees in 35 laboratories.

HDS

Hitachi Data Systems

INFORMATION SYSTEMS: THE NEXT 10 YEARS

AN IDC WHITE PAPER FOR INFORMATION SYSTEMS MANAGEMENT

THE DATA WAREHOUSE

THE CHALLENGE OF PERSONAL COMPUTERS

NEEDS OF THE '90s

MAINFRAME MARKET DYNAMICS

TECHNOLOGY ADVANCES

REACHING FOR RELIABILITY

THE "LOGICAL" MAINFRAME

EXPERT SYSTEMS

PERIPHERALS

FIBER OPTICS AT THE HEART OF COMMUNICATIONS

OPERATING SYSTEMS: THE GLUE

UNIX AND THE DATA CENTER

APPLICATION SOFTWARE: THE CATALYST

DIAGNOSTICS AND SOFTWARE

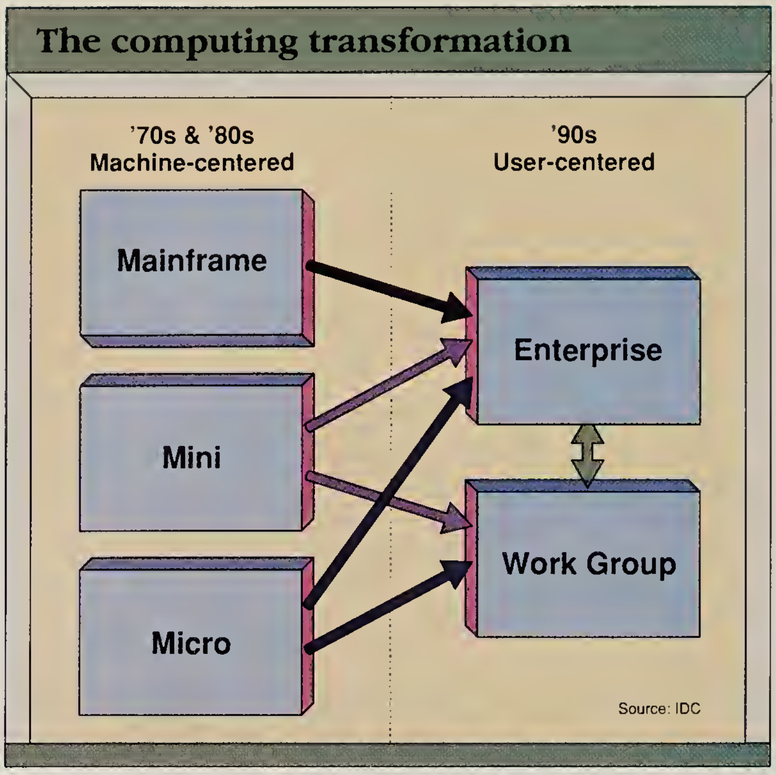
FUTURE SHOCK

> *"WITH THE AMOUNT OF MONEY SPENT ON IS OVER THE LAST 10 YEARS, I COULD HAVE BOUGHT TOYOTA AND NISSAN OUTRIGHT."*
>
> *—FORMER GENERAL MOTORS CHAIRMAN ROGER SMITH*

INFORMATION SYSTEMS: THE NEXT 10 YEARS

OVER THE NEXT 10 YEARS, MAINFRAME COMPUTERS WILL CONTINUE TO PROVIDE CORPORATE-WIDE ACCESS, CONNECTIVITY, CONTROL AND MANAGEMENT OF INVALUABLE CORPORATE DATA ASSETS. IN THE INCREASINGLY COMPETITIVE BUSINESS CLIMATE OF THE '90s, MAINFRAMES WILL DO THIS BY ANSWERING THE CALL FOR DISTRIBUTED PROCESSING POWER OVER WORLDWIDE NETWORKS. THAT IS WHAT THEY WILL DO; WHAT THEY WILL NOT DO IS GO AWAY. ■ CONSIDER, AS AN EXAMPLE OF THIS URGENT NEW "EXTENDED ENTERPRISE" ENVIRONMENT, A TYPICAL HIGH TECH MANUFACTURING company with headquarters in the northeastern United States. Its manufacturing operations are centered in Asia. Its subcontracted design work is done in Ireland. Sales offices are sprinkled around the world with coordination in San Francisco. Research and Development is in Germany. A truly global operation. Corporate IS is responsible for ensuring the smooth, secure and timely transfer of sensitive company data across all these far-flung locales. In reality, that means seamlessly linking dozens of different systems and networks that are subject to different government regulatory restrictions. Mainframes make this sprawling international operation work by acting as hubs that connect the various locations.

In the late '80s, data processing architectures were compressed from three tiers to two: The machine-oriented dominions of mainframes, minicomputers and PCs were broken down and reformed into user-oriented enterprise and work-group domains. This new architectural focus has received various labels, including "cooperative processing" and "client/server" computing. No matter what it is called, traditional mainframes will play the central role in its operation.



Mainframes are poised to play the leading role in the new computing architectures of the '90s.

THE DATA WAREHOUSE

The mainframes of 1995 will be characterized as data vaults or warehouses for the enterprise. These huge providers of services will control communications, provide security, and manage data access and throughput for a system of interlocking databases. This will lead to a high level of diverse database integration, enhanced system integrity, and in the end, a cost-effective array of hardware, software and personnel.

Despite the much-publicized movement toward downsizing, few companies expect to erase the need for large mainframes any time in the near future. In fact, the strategic plans of most large organizations run to the contrary. The reallocation of selected processing, and in some cases selected control, to workstation-based, end-user departments is generating an increased workload for mainframes. This shows the role of mainframes is becoming more, not less, important. There are several reasons:

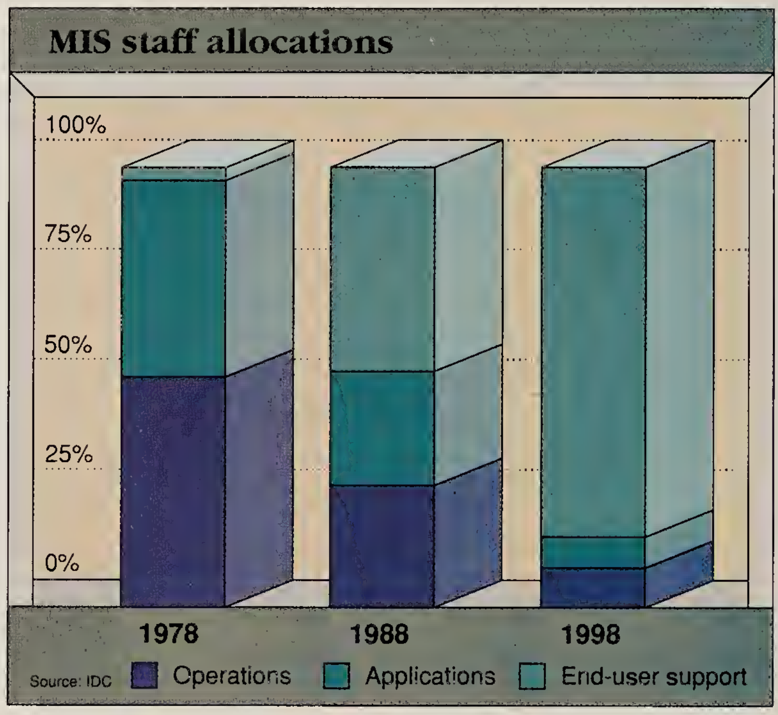
- At the high end of the processing-power scale, large mainframes cannot be readily and cost-effectively matched by incremental additions of small processors. This is especially true in high-volume transaction processing

- Mainframes have sophisticated security mechanisms for both access of data resources and secured transmission of sensitive, valuable data

- Formal and standardized procedures and products for reliable backup and recovery on mainframes have been developed over the years, insuring system integrity. The lack of these procedures and products is the most frequent cause of failure for distributed networks linking smaller machines

- Mainframes provide the automated control and integration of storage devices as well as other peripherals and resources necessary to carry on a global business

- Mainframes provide system control and all-important auditing facilities that maintain data, applications and operating-system integrity.



Tending to an increasingly computer-literate end-user population will become a major preoccupation with MIS staffs by 1998.

THE CHALLENGE OF PERSONAL COMPUTERS

Since their introduction in the early '80s, personal computers have been touted as "mainframe killers." It is true that, incrementally, the growth of power in the form of millions of instructions per second (MIPS) has increased much more rapidly in personal computers than in mainframes. This remarkable growth in raw processing power played a major role in the migration of specific applications from mainframes to smaller machines such as personal computers.

PCs have several distinct competitive advantages over mainframes:

- They are easier to learn, easier to install and easier to use, particularly for the non-DP-professional

- Relative to mainframe computing power, personal computers can provide a very cost-effective solution for certain types of standalone or departmental processing such as spread sheets, word processing or application development

- Hardware and software problems on PCs require relatively lower maintenance skills which are widely available.

However, while PCs are very powerful when properly applied to the appropriate problem, they are not viable alternatives to mainframes for jobs that require robust security, task interleaving with other data processing jobs, and high rates of transaction processing. There are many recent examples of corporate data processing jobs that were offloaded to PC networks. Within months, MIS directors were asked to recapture and reschedule these jobs back to mainframes due to poor security, and the difficulty in administering, managing and repairing local area networks (LANs). Few organizations have realized the optimal organizational structure required to properly and successfully support distributed processing across LANs.

NEEDS OF THE '90s

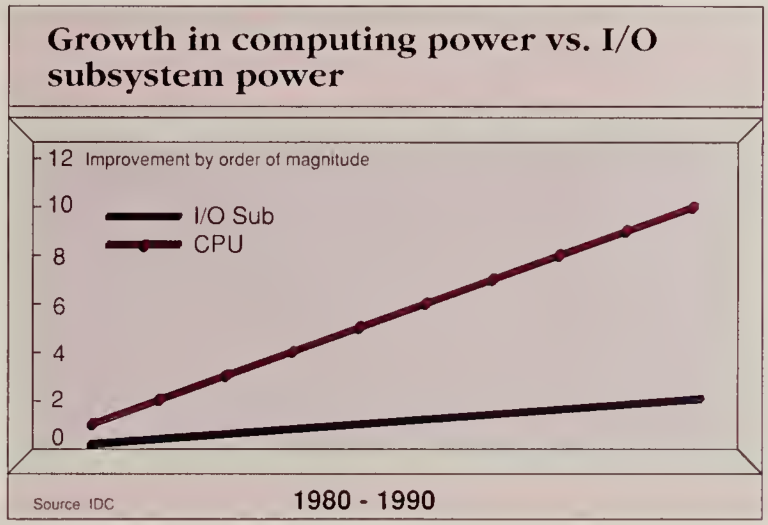
Long gone are the days of 15% annual staff growth with salary increases to match. If anything, staff reductions are the order of the day. Commercial data processing departments are realizing that the work force needed to support large computing systems must be closely controlled and, in many cases, reduced. Further, retained personnel are being asked to expand their expertise and work toward achieving the objectives of the core business.

In these lean times, both MIS managers and vendors are faced with a paradox. Corporate management says the computing complexity can increase as long as personnel and training required to support and manage it declines. Given this new criterion for buying computers, hardware vendors will be under constant pressure to provide more cost-effective systems.

The computer processor environment over the next five to 10 years will continue on its heterogeneous path. Along this path, corporate data processing departments are moving into an era of hardware specialization. They are dedicating mainframes to the management of very specific business situations such as automated teller machines, on-line transaction processing (OLTP) and batch processing. It is not unusual for each of these dedicated processors to come from different vendors. Therefore, the challenge is to maintain multi-vendor hardware solutions with limited staff.

MAINFRAME MARKET DYNAMICS

In a recent IDC survey of 75 senior MIS managers with IBM 3090-class mainframes, respondents were asked to discuss their plans for acquiring large computers over the next three years. Of those who are planning an acquisition during that time period, 58% are considering IBM, but models other than the newly-announced ES/9000 series. Nineteen percent are considering a plug compatible manufacturer (PCM) solution from vendors such as Hitachi Data Systems (HDS) or Amdahl. Twenty-three percent are considering a non-IBM-compatible mainframe or Unix acquisition. The fact that large-processor users are expressing an early, tentative approach to the newly-announced IBM ES/9000 is no surprise. Users typically warm up slowly to new machines.


Growth in computing power vs. I/O subsystem power

Source IDC

As the growth of CPU performance has outstripped increases in input/output subsystem power, local area networks have been enlisted to offload mainframes.

Soaring mainframe growth, which reached nearly 20% at times during the past 20 years, gave way to a modest growth rate of 5% to 7% by 1990. Barring any unexpected and unprecedented technological breakthroughs, IDC predicts similar unspectacular growth —but not unspectacular profits—for the '90s.

The promise of mainframe longevity and the possibility of 70% profit margins has resulted in cutthroat marketing campaigns by IBM and the PCMs. Once a group much larger in number during the glory days of the "BUNCH," the PCMs are now limited to Amdahl and HDS. Both companies are expected to demonstrate staying power over the next 10 years.

The PCM marketing push has clearly been felt by the perennial leader, IBM, as that company's market share has slowly eroded. Big Blue has lost customers to the PCM vendors primarily on price/performance issues.

Prior to the fall of 1990, a period that saw several important announcements concerning mainframe technology, the mainframe market shares for the leading vendors were:

IBM	68%
Unisys	17%
Amdahl	9%
Hitachi Data Systems	3%
Bull HW	2%
Control Data	1%

The 1990 competition picked up during June when HDS announced the industry's fastest processor, the model EX/420. The EX/420 is rated at approximately 150 MIPS. This introduction was followed in short order by rapid-fire announcements from Amdahl, Fujitsu and IBM. This series of announcements virtually restructured mainframe technology.

The new machine families offer dramatically new features and functions with the promise of even more advanced features over the next several years. HDS seems to have come out a winner in this new-product derby as 16% of survey respondents say their companies are now planning on buying HDS machines. Otherwise, the introductions did not seem to have a great impact on future brand loyalty. Some 62% of respondents still expect to buy from Big Blue.

Internationally, five-year mainframe-market growth in the Pacific Rim is expected to double that of the rest of the world. The Japanese, Australian and Asian markets pose an interesting dilemma for mainframe makers. IBM systems compatibility is less critical in these markets than in the U.S. As a result, several European and Far Eastern manufacturers have aggressively carved out and maintained a significant market share. Thus, IBM and the PCMs have found themselves in the unaccustomed position of playing catch-up.

The aggressive marketing of the PCM vendors, joint ventures and far reaching marketing agreements among industry giants have IBM looking anxiously over its shoulder. What it sees is Fujitsu buying International Computers Ltd. outright, and 42% of Amdahl. In another similar move, Electronic Data Systems bought 20% of HDS. Rarely lacking in marketing acumen, IBM is expected to have more than 100 strategic alliances of its own, mostly with

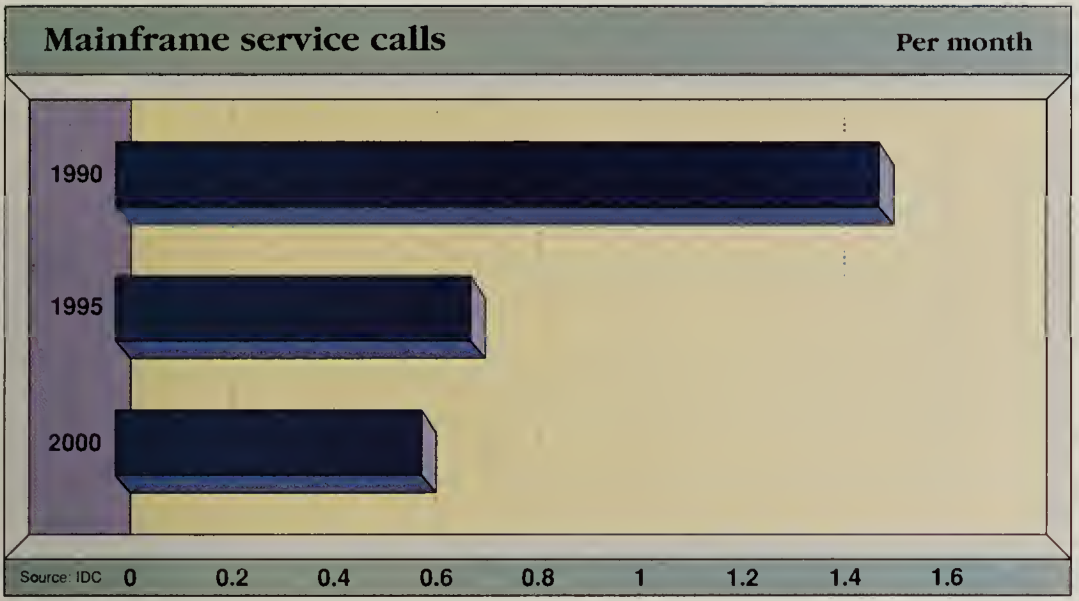
1,100

WE'VE DOCTORED THIS NUMBER.

Hitachi, Ltd. has over 1,100 PhDs on staff. To the best of our knowledge, no single corporation has more employees with doctorates. Many of these highly qualified specialists work in areas that benefit the development of the mainframes and storage systems of Hitachi Data Systems.

HDS

Hitachi Data Systems



The decreasing number of mainframe service calls creates higher user expectations for large applications such as airlines reservations and banking.

software partners, before January 1, 1991.

Less than five years ago, the top price for the high-end machine in a mainframe family was in the range of $5 to $6 million. Today, these machines exceed $24 million. Add in the large margins which hardware designers require to support R and D efforts, and these price tags will only climb. Despite such astronomical costs, however, there is no sign that the world's largest corporations are reluctant to buy. They have to buy if they want to compete.

On a positive and less expensive note, significant savings can be realized from operational consolidation. Money can also be saved by agreeing to new hardware purchases only if free software licenses are included. For example, an IBM buyer might save the $250,000 yearly cost of DB2. Mainframes have a definite advantage over smaller computers in this area.

TECHNOLOGY ADVANCES

Technological advancements came with dizzying rapidity in the '80s, and will continue to do so in the '90s. Processors, from the most powerful mainframes down through the least powerful personal computers, increased in speed dramatically. We have reached the point now where speed improvements of 25% to 30% per year are taken for granted—and even demanded—by some end users.

General-purpose processor speeds are now in the 150-to-210 MIPS range and expected to reach 300 to 500 MIPS by 1995. They will hit 1,000 MIPS and more by the year 2000. Fujitsu, a leading Japanese mainframe manufacturer, hints that it is developing a 600-MIPS machine. When it will reach the market is a matter of debate. At this point, there are very few applications that require or can fully take advantage of that kind of power. Actual applications that could utilize such fast machines are generally found in the military.

As commercial applications begin to require such processing power, it seems likely that a customized configuration will be developed for each individual installation. This is not an an extraordinary expectation given the sums of money that will be invested by users.

Advances in processor design include the implementation of improved instructions that control processing within the computer. Smaller machines with reduced instruction set computing (RISC) and scalable processor architecture (SPARC) are now common, although such technologies are not expected to gain widespread use in the mainframe class until 1995, at the earliest.

Despite advances in hardware miniaturization, dramatic reductions in the size of mainframe computers are not expected soon. A quick look inside almost any current large model reveals considerable open space that is required for easy access.

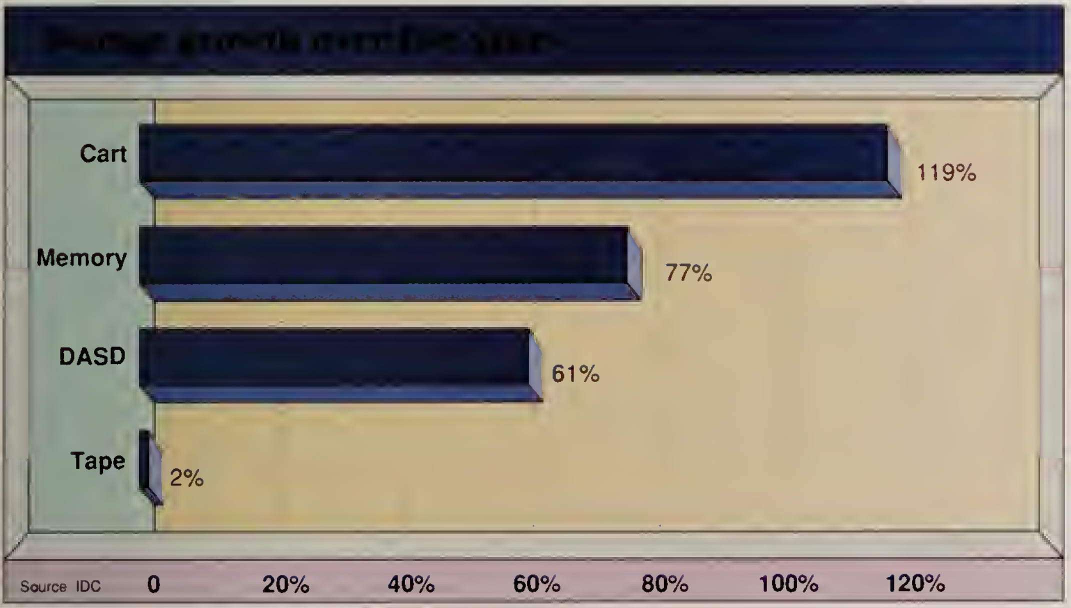
Despite all the technological gains, however, the disparity between the computer's ability to "crunch" data and its ability to move data through input/output subsystems is disappointing. CPUs simply cannot move data around as fast as they can process it. One solution to this shortcoming is the use of work-group-oriented LANs.

This disparity continues to exist even after the introduction of IBM's Enterprise System Connection Architecture (ESCON). This dramatic new channel architecture uses a light-emitting diode as the light source, and fiber-optic cable as the transmission medium. ESCON allows direct-access storage devices (DASDs) to be located up to five miles—instead of only several hundred feet—from mainframes. It also provides 10M bit/sec transmission I/O speed, which, although fast, still lags behind internal CPU speed.

In order to put the issue in perspective, consider this: CPU cycle times are in the nanosecond (one-millionth of a second) range. I/O subsystems operate in the millisecond (one-thousandth of a second) range. If we arbitrarily assign one nanosecond as one hour, then one millisecond is approximately 41 days.

REACHING FOR RELIABILITY

Asked to comment on mainframe service calls, survey respondents say they expect



"DASD farms" are a hot storage topic, but self-loading "juke box" cartridges are slated for faster growth over the next five years.

the number of these calls to decrease from 1.5 to 0.6 a month by the year 2000. In such a stable environment, users will demand an even higher rate of reliability for such applications as airlines reservations, banking, credit card processing and point-of-sale transactions. While the majority of today's mainframes is not fault-tolerant, there are vendors that have specifically designed their machines to offer 100% reliability. The demand for such perfection will surely engender industry-wide, mainframe fault-tolerance within the next 10 years. It is needed now.

Mainframe reliability is worth its weight in gold. Retail credit card operations are a good example. Research indicates that if a retail credit card validation is delayed longer than 15 seconds, the consumer will offer another card. Thus, the first credit card company loses an opportunity to, in effect, grant a high-interest, short-term loan. Mainframe makers are motivated by the fact that credit card companies typically purchase whatever processing equipment brings them lower response times.

THE "LOGICAL" MAINFRAME

The 24-hours-per-day, seven-days-per-week, 365-days-per-year processing schedule is standard operating procedure in most large organizations with critical time requirements. The future decade will carry this a step further by making any downtime unacceptable.

This demanding environment is spawning what IDC calls "distributed data center complexes." Distributed data center complexes are a collection of geographically diverse data centers coupled by wideband, wide-area communication capabilities. Each complex is tightly coupled with all other complexes, sharing central memory, storage and other mainframe facilities. The number of central processing units contained in each of these complexes is increasing. Currently, there is a maximum of eight. That number could reach 24 by 1995.

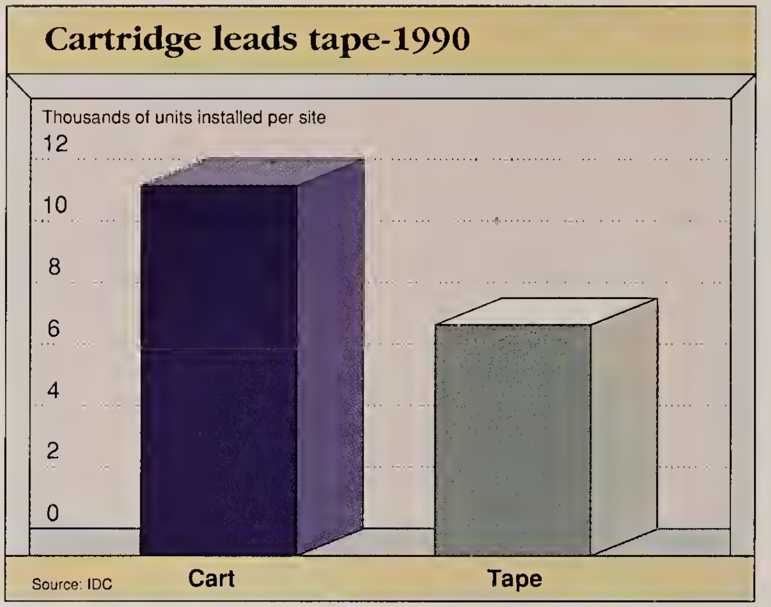
In this environment, each of these distributed data center complexes—while to a large degree self-contained—requires information sharing with smaller, "mini-mainframes." These unattended "lights-out" systems could be located regionally or in departments.

Overall enterprise control of such communication will be accomplished by a "logical" mainframe—a distributed data center computer that stands logically apart from any other CPUs. This master computer will not be invasive. It will not make modifications to any of the "outlying" operating systems. Its automated process control will not retard the performance of the host systems. Its strategic decisions will be made transparently and according to priorities established by management.

EXPERT SYSTEMS

In order to manage and control processing, enterprise-wide systems of the future will require more knowledge than any one person can supply. Artificial intelligence, or more precisely, mainframe-based expert systems, will help fill this knowledge gap. These systems are comprised of knowledge and rules built by extracting decades of experience from hundreds of hours of interviews with human experts. Expert systems will gradually replace the human component and make the thousands of split-second decisions needed to run a large mainframe complex on a daily basis.

Without such systems—and they are finding their way into data centers now—the complexity of running data centers efficiently will quickly push machine-operating personnel to their limits. They will be overburdened as schedules, workload balance, and the need for 100% uptime require processing that will be divided among distributed heterogeneous mainframes. The scope of the task increases significantly when performance, network, resource and data management are included.



Source: IDC

The average IDC survey site has 13,000 cartridge tape units installed, as opposed to only 8,500 reel-based units.

According to the IDC survey, portability and integration of multi-vendor hardware and software solutions is rated as one of the most pressing issues facing IS management over the next five to 10 years. The object-oriented environments used by expert systems address those two issues by raising the level of portability and easing multi-vendor integration. As a result, the accumulated expertise gathered from many highly technical disciplines is transmitted to organizations that would otherwise go without.

PERIPHERALS

When speaking about mainframes, the term "peripheral" has become synonymous with data storage devices and printers. While they play a significant role, there are also vast numbers of personal computers and workstations urgently requesting data from mainframe-based master data repositories.

In order to provide that support, peripheral storage devices, whether they be traditional, rotating, DASDs, or some other medium such as optical disk, will be used heavily. Survey respondents believe that the growth of DASD will increase over the next five years by a robust 61%. However, they also believe that tape storage will grow an even more impressive 119%. That growth is largely reserved for the newer, smaller cartridge tapes, as opposed to the traditional reel-mounted versions. The cartridge devices offer several key advantages, but one stands out: the ability to automate the mounting process with so called carousel or "juke box" hardware. This eliminates virtually all human intervention.

While optical disk storage devices have been available for some time, acceptance of these devices within mainframe environments has not been overwhelming. Currently, write-once-read-many (WORM) technology is finding a niche in such areas as image processing and microfiche replacement, and is much favored by government agencies such as the IRS. Advances in this technology, such as multi-function disks, are expected to expand the market, but not on a large scale. Mainframe optical-disk devices made up less than 5% of disk shipments in 1989, and barring an unexpected breakthrough, that market share is not expected to increase dramatically over the next five years.

55,000

WE'RE TRYING TO PATENT THIS NUMBER.

Hitachi, Ltd. already holds over 50,000 worldwide patents. And that number continues growing. Last year 1,053 new patents were applied for in the U.S. alone, positioning Hitachi, Ltd. as the leading patent filer in the U.S. three out of the last four years. Many of these innovations are being directly applied to the products of Hitachi Data Systems.

HDS

Hitachi Data Systems

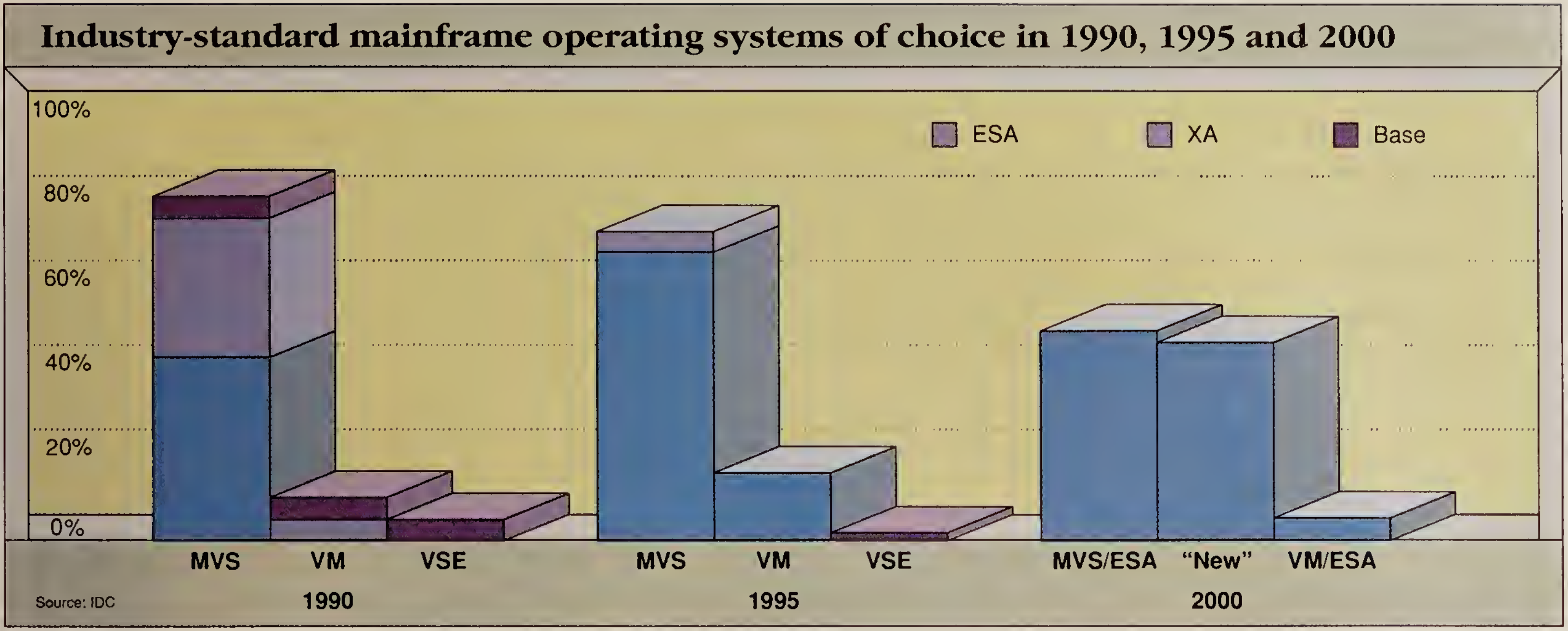
20,000

WE'RE PUTTING THIS NUMBER ON THE LINE.

The Hitachi, Ltd. product line is over 20,000 strong and growing. This ranges from consumer audio and video products to bullet trains, medical equipment and hydroelectric power plants. It also includes the advanced computing products of Hitachi Data Systems, which benefits from the broad technical expertise of Hitachi, Ltd.

HDS

Hitachi Data Systems



Industry-standard mainframe operating systems of choice in 1990, 1995 and 2000

Source: IDC

Users anticipate the emergence of a new operating system by the turn of the century.

FIBER OPTICS AT THE HEART OF COMMUNICATIONS

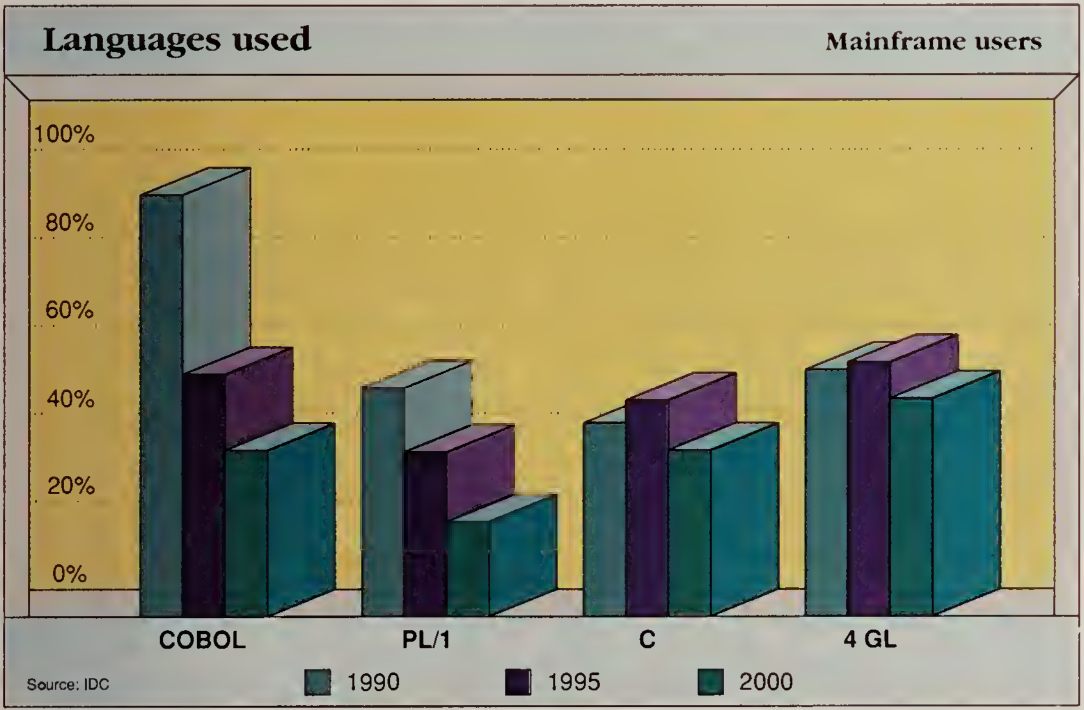
The explosion of peripheral input/output devices required by OLTP has engendered two new remote data storage entities. The first is the "DASD farm," while the second, more futuristic one, is the remote "optical-storage plantation." Success in moving very large amounts of sensitive data over long distances to either of these two requires reliable, high quality communication capacity. This capacity is increasingly being supplied by internal fiber-optic mainframe links and external fiber-optic networks.

The expansion of fiber-optic technology has given new life to remote sites. The combination of fiber and channel extenders can bring logical mainframe processing to any remote site. In the case of system failures, this same combination bolsters disaster recovery by greatly enhancing the reliability of continuous, on-line computing links to remote backup mainframes.

OPERATING SYSTEMS: THE GLUE

As mainframes increase in power, operating systems must keep pace. Sophisticated hardware complexities can be fully utilized if the software is easy for human operators to use.

Mainframe operating systems must have the power and intelligence to operate in a near-fault-tolerant manner. They must be easy to install, maintain and integrate. Newer versions from IBM, Digital Equipment Corp., and others are following a clearly defined path toward these objectives. While each new year sees significant developments, survey respondents still expect their operating system to come from IBM over the next five years. Not surprisingly, sometime in the next decade, they expect an undefined new operating system to appear.



Languages used **Mainframe users**

Source: IDC

The movement toward fourth-generation languages will slacken after 1995, as users look for something better.

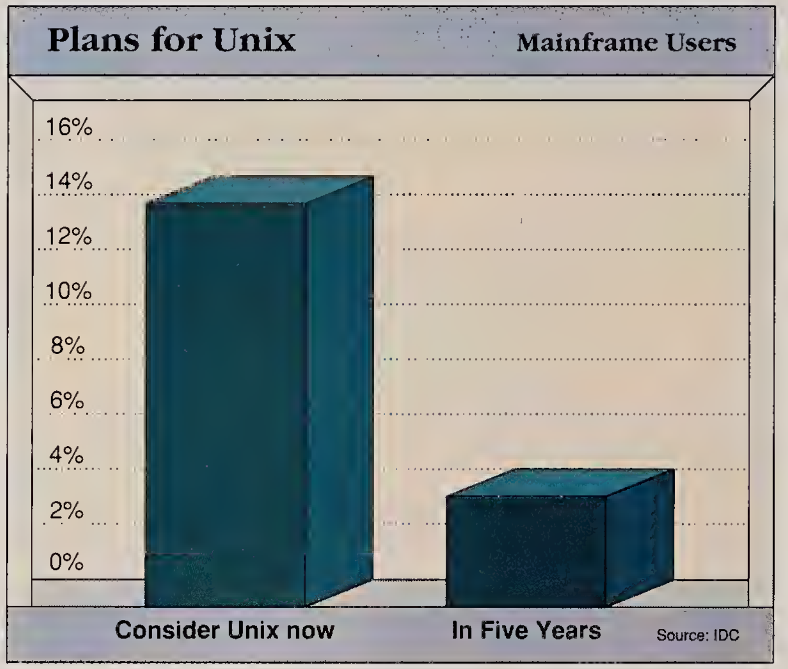
UNIX AND THE DATA CENTER

The Unix operating system, which originated in the late '60s at the Bell Labs division of AT&T, is well known for its flexibility in supporting long-distance telephone communications. Unix provides a simple, very robust operating system with an emphasis on fault-tolerance. Most of the major mainframe vendors have given a passing acknowledgment to Unix by supporting it or some close derivative on their platforms.

To date, however, the very traits that allow Unix to achieve fault-tolerance cause it to be functionally deficient in the sophisticated facilities required to support full-scale commercial applications. Of prime concern is the lack of tight, manageable security. Moreover, traditional mainframe users maintain that Unix has a shortage of operating system tools and utilities. This, they say, prevents the operations staff from closely monitoring and managing mainframes. Realizing this, software vendors are rapidly offering more Unix system software.

Interestingly, Unix's lack of complex utilities and system software is viewed by many as a saving grace. They say the lack of utilities results in much simpler machine configurations, which in turn can lead to far less expensive operations.

The general feeling is that Unix has not yet become a full-function, commercially-oriented operating system. However, few doubt its potential. In fact, 15% of survey respondents state they are currently considering the use of Unix. However, only 4% say they will consider implementing Unix in the next five years.



Source: IDC

APPLICATIONS SOFTWARE: THE CATALYST

Applications will continue to drive the need for faster mainframes. The new application development paradigm will see application developers utilize new languages and tools that dramatically cut the time required to develop new applications. Programmers are already reducing the great bulk of their time spent writing third-generation computer code. But this expected transformation will not happen over night. The survey reveals use of COBOL at 92% of the companies surveyed. Indeed, there are currently some 100 billion lines of COBOL code in existence.

The 92% figure is expected to drop slowly to 56% over the next five years, and to 35% in 10 years. Even then it will lead alternatives such as PL/1 and C. This adherence to COBOL is a reflection of the massive investment in installed code now existing in data processing libraries. It also reflects the difficulty in migrating away from applications that have no documentation or exist only as machine code.

While many additional application development departments would sorely like to migrate to a more productive fourth-generation language, the inability to safely understand the logical flow of 20-year-old programs with unnumbered patches remains a major impediment. Still, 57% of respondents currently utilize a fourth-generation language. That percentage is expected to increase somewhat over the next five years.

DIAGNOSTICS AND SOFTWARE

In the future, mainframe hardware and software will work more closely than ever. In fact, as hardware gets less expensive, a phenomenon that occurs at a rate of at least 25% per year, sales will be made on the issue of software function. Manufacturers already realize that offering strictly hardware is a shortcut to disaster. In order to maintain market presence and share, most vendors will aggressively and closely integrate hardware and software. This will be most true in the area of maintenance and service.

The survey found 82% of respondents had installed some type of software-based automated diagnostic capability. While many packages are available, most of those installed on mainframes will "sense" an impending problem before a critical stage is reached and actually call the manufacturer's service facility via an integral modem. Further, these diagnostic tools place a probability on impending failure and suggest replacement parts. Therefore, a technician dispatched from the vendor's facility will usually arrive at the installation with all parts required to fix the problem before it occurs.

IDC predicts that by 1995, advanced diagnostic capabilities will virtually eliminate outages. By then, diagnostic capabilities of one processor will help resolve problems with others. Automatic error recovery of circuits, channels and media devices will be the key to assuring 100% system availability. Currently, there is at least one mainframe-based hardware and software package that detects and calls in possible future problems.

FUTURE SHOCK

Data processing end users are becoming increasingly computer literate, a trend that will continue. They are growing more aware of the potential power that exists in the data center and demanding their share. This is not an unreasonable demand for the ultimate bill payer. Therefore, expectations will soar to the near-impossible, and the MIS departments will have to deliver. Measurable standards and service-level agreements will be developed and accepted, forcing MIS departments to comply with tightly-defined thresholds of reliability, availability and serviceability.

The role of MIS professionals will change significantly in this high-pressure environment. Their expertise will be used at higher levels within the organization; they will be viewed as enterprise consultants. Meanwhile, technicians will concentrate on training, custom-tuning hardware for specific business requirements, and problem solving.

Open architecture will give way to a completely object-oriented approach, where even the technicians will be all but immune to hardware and software configurations. The tedious definition of OLTP configurations, data communications networks, establishing performance criteria, and monitoring a myriad of operating thresholds will all reside in software. Organizations will no longer be able to afford problem solvers. A new job description will arise, that of "problem preventer." Assisted by highly-automated software products, system operators will have expert support in managing machine-speed systems linked to multi-vendor networks and applications.

The era of the self-managed system is not far away. Systems of the 21st century will require so much sophistication and technical specialization they will have to manage themselves. The mainframe of 1998 will control the master console. It will direct the system to seek and maintain balance as determined by an "operator" that may be a computer located thousands of miles away.

4

THIS NUMBER IS THE CORE OF OUR BUSINESS.

We're Hitachi Data Systems. By applying the vast resources and expertise of our parent company to four key product areas, HDS has become a leader in both high performance and reliability. These product areas include mainframe systems, DASD, cartridge tape devices and semiconductor disks. One example of our innovation is the HDS EX™ Series of mainframes. With over 20 models to choose from, including our newest, most powerful EX 420, the EX Series protects your investment through a 30-fold growth path and complete compatibility.

HDS

EX is a trademark of Hitachi Data Systems

Hitachi Data Systems

203

THIS NUMBER KNOWS THE RIGHT NUMBER.

In our very first year as Hitachi Data Systems, we added to our client list over 200 new companies from 36 countries around the world. To learn why, contact your local sales office. Or call HDS today at **(408) 970-1000.** Let us put together some numbers for you.

Hitachi Data Systems, 750 Central Expressway, P.O. Box 54996, Santa Clara, CA 95054-0996

HDS

Hitachi Data Systems

NEW PRODUCTS — SOFTWARE

System software

Goal Systems International, Inc. has announced a disaster recovery system that automates various processes used during a system recovery procedure.

Arise II automatically identifies, tracks and reports on the essential components of user-selected applications, identifies resources necessary to support such applications at an alternate site and creates and maintains recovery job control language.

The product can also be used to identify the direct-access storage device requirements needed for data set recoveries, the vendor said.

Pricing ranges from $42,000 to $64,000.

Goal Systems International
7965 N. High St.
Columbus, Ohio 43235
(614) 888-1775

Development tools

SQL Solutions, Inc.'s SQR Developer's Kit, a recently announced debugging environment for programmers, automates the process of error tracing, scoping variables and determining program structure.

The product is currently available for Oracle Systems Corp.'s Oracle and Sybase, Inc.'s Sybase relational database management systems running on DOS, OS/2, VMS and Unix platforms. It is being included as an option with SQL's SQR family of fourth-generation languages. Pricing ranges from $250 to $10,000, depending on type of platform.

SQL Solutions
8 New England Executive Park
Burlington, Mass. 01803
(617) 270-4150

Alsys, Inc. has announced a version of its Ada development environment that was designed for IBM 370 platforms running under AIX.

AIX Ada includes the same user interface and tool set as previous versions. Pricing ranges from $45,000 to $150,000, depending on CPU size.

Alsys
67 S. Bedford St.
Burlington, Mass. 01803
(617) 270-0030

Utilities

Advanced Systems Concepts, Inc. has announced a tape sharing software product designed for Digital Equipment Corp. Vaxcluster systems.

Tapeshare allows locally attached tape devices to be transparently served to other nodes in a Vaxcluster configuration. It enables users of an entire Vaxcluster to access a tape device without requiring any additional hardware, the vendor said.

Version 1.0 of Tapeshare is scheduled to begin shipping this month.

The product is priced between $1,000 and $12,500, depending on CPU model.

Advanced Systems Concepts
33-41 Newark St.
Hoboken, N.J. 07030
(201) 798-6400

Sterling Software's Dylakor Division has introduced a front-end software product that supports many key functions of Sterling's DYL-Audit Excel auditing and financial system.

DYL-Online TSO Release 3.3 enables users to create, test and run DYL-280, DYL-280 II and DYL-Audit Excel programs by using English-like commands.

Pricing ranges from $10,000 to $16,500, depending on the type of IBM processor group on the host CPU.

Sterling Software
9340 Owensmouth Ave.
Chatsworth, Calif. 91313
(818) 718-8877

Legent Corp. has announced a report distribution package that features customized output facilities and formatting capabilities.

Release 4.0 of Bundl includes a custom view facility that enables a data center to deliver information to its clients in a format the client wants, the vendor said. End users working with on-line reports can use the product for reformatting, defining and storing up to 36 formatting profiles or reprinting a customized report.

The product runs under all versions of MVS running JES2 or JES3. Annual lease pricing starts at $22,500.

Legent
2 Allegheny Center
Pittsburgh, Pa. 15212
(412) 323-2600

Cynosure, Inc. has released system management utilities for IBM Application System/400 and System/38 computers.

The products include Byte Size History ($300), which provides usage trend analysis and a history of storage consumed by objects, files or libraries; Disk Usage ($300), which provides point-in-time analysis of data storage capacity; View CPU History ($300), which generates accounts of how users consume CPU resources; Job Tracking Analysis ($1,500), which monitors system resource use; and Time Reporting System ($1,500), which tracks the amount of time that staff members work on projects.

Cynosure
2550 W. Golf Road
Rolling Meadows, Ill. 60008
(708) 228-2360

Computerworld
EDITORIAL REPRINTS

Reprints from *Computerworld* provide a valuable marketing/sales tool for your company!

Editorial articles are available as reprints and can be ordered in various quantities, and customized to include your company logo and sales offices. Whether you wish to have reprints of an article written specifically about your company or a subject of general interest, these reprints* can be a great resource for use in:

- Promotional/P.R. materials
- Company seminars
- Internal meetings

* Produced in a minimum quantities of 500 for black-and-white and two color reprints; 1,000 for four-color reprints.

For complete information on ordering reprints contact:

Sharon Bryant
Reprints Department
Computerworld
375 Cochituate Road
Framingham, MA 01701-9171
Tel. 508-879-0700

COMPUTERWORLD
INSIDE
IBM kick-starts SAA onto office track
Runaway program gores Sabre

COMPUTERWORLD
The newspaper for information systems management

Ten of Europe's toughest critics awarded Wyse their top prize. Over 3 million even tougher critics awarded us their business.

Hannover, Germany, 1990: European experts judging at CeBIT, the world's largest computer exposition, give their top design award to the Wyse PC Model 3225. ■ No big surprise. Wyse design has been winning over computer professionals for nearly a decade. It's won, in fact, an installed base of more than 3,000,000 terminals and PCs. ■ Because Wyse design is also a wise investment. It delivers more features, styling and ergonomics than the competition. For less money. Witness, for example, the Wyse family of Novell-certified personal computers. ■ The CeBIT award winner, our Model 3225, is a 25 MHz 386 that gives you more MIPS for your money than Compaq's DeskPro 386/25 or IBM's PS/2 Model 70. It's very likely the most cost effective server or CAD/CAM workstation you'll find anywhere. ■ Likewise, our 3016SX at 16 MHz outperforms Compaq's DeskPro 386S and IBM's PS/2 Model 55. Expandable to 16MB of RAM, it's the best SX value around for the demanding user. ■ For entry level users who plan to grow, our Model 2012i at 12 MHz 286 desktop offers 7 expansion slots, 4 drive bays, and up to 16MB RAM. It's the most expandable PC in its price range. ■ All these Wyse systems include MS-DOS 3.3 at no extra charge. To learn more about their winning ways, call 1-800-438-9973.

THE WORLD IS GETTING WYSE.

The Wyse Novell-certified PC family, led by our CeBIT award-winning Model 3225. Wyse PCs are among the smartest investments any business can make today.

WYSE

1 800 GET WYSE

WYSE is a registered trademark and Models 2012i, 3016SX, and 3225 are trademarks of Wyse Technology Inc. All other trademarks are property of their respective owners. © 1990, Wyse Technology Inc.

Scanner users see new benefits

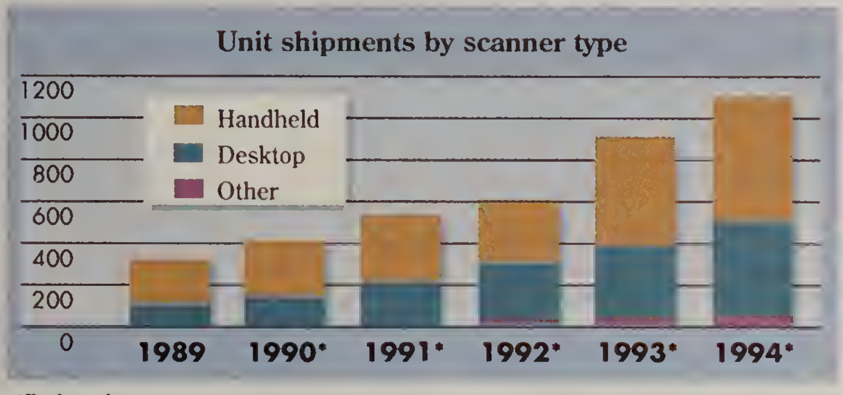
Features once found on $50,000 systems are now available for $6,000

ANALYSIS

BY ELLIS BOOKER
CW STAFF

In hand

Handheld scanners will hold a slight edge, but both handheld and desktop scanners are expected to show solid growth during the next four years



*Projected

Source: BIS CAP International

CW Chart: Paul Mock

Steady improvements in features and price/performance of optical scanners are benefiting users ranging from those with simple needs (a personal computer connected to a desktop scanner capable of processing a few pages per minute) to those with specialized, high-speed applications that require dedicated servers and scanners able to handle hundreds of pages per minute.

According to analysts and vendors, scanner technology has improved within the past two years, pushing features once found only in $50,000 systems onto $6,000 devices suitable for PC applications.

A three-tier market

There are three levels in the scanner market today, said Scott McCready, director of image systems at International Data Corp. in Framingham, Mass., and a principal at Avante Technology, Inc., a consulting firm specializing in imaging systems:

- Desktop scanners able to process between two and six pages per minute and ranging in price from $5,000 to $18,000.
- Midrange scanners, which are often paired with a dedicated server, able to process six to 20 pages per minute and priced from $6,500 to $20,000.
- High-end systems capable of scanning hundreds of pages per minute, priced from $50,000 to $120,000.

At the high end, McCready said, improvements over the past two years have been in the mundane but important area of paper transport. "They've simplified the mechanism that transports the paper through [the scanner]," he said, adding that the best scanners on the market can handle "tissue paper to cardboard with paper clips on it."

Meanwhile, midrange scanners have gained the ability to correctly position the paper that enters them from an automated feeder, enabling them to make an accurate scan. Two years ago, McCready said, this feature was found only in devices costing $50,000 or more.

There will also be an increasing demand for inexpensive ($250 to $400) handheld scanners and optical character recognition (OCR) software for use by individuals at their desks, predicted Kristy Holch, a market analyst at BIS CAP International, Inc. in Norwell, Mass.

"I think the laptop market is another opportunity," Holch said, noting that, until now, handheld scanners "haven't been marketed as something to take along to the trade show."

Another development includes the introduction of bar-code readers into scanners. A number of imaging applications have begun using bar codes on incoming documents as a way of automating the labor-intensive but crucial job of indexing the document once it has been scanned into the image database.

Two other technical improvements include the appearance of double-sided scanners and those with small computer systems interface (SCSI) ports. Unlike the relatively sluggish 19.2K bit/sec. speed of the standard RS-232C interface, a SCSI port can transfer data at 5M bit/sec., which makes a difference given that an image data file of a page can be 10 to 20 times larger than its ASCII text equivalent.

"Font independence is here today," said Wayne Crandall, vice president of sales and marketing communications at 2-year-old Xerox Imaging Systems, a wholly owned Xerox Corp. subsidiary in Cambridge, Mass., that was formed when Xerox merged Kurzweil Computer Products and Datacopy Corp.

Crandall claimed Xerox broke the $10,000 omnifont (font-independent) barrier as far back as 1987 with a PC-based product, but Crandall said he believes scanners able to consistently recognize handwritten fonts will be generically available in the middle of this decade. There are already some systems that can recognize numerical data.

Part of the problem is that font-independent recognition requires computational overhead.

Trying to separate high-speed scanning from the OCR function, Xerox introduced in June the K5200, a reduced instruction set computing-based processor with 6M bytes of

Continued on page 60

Borland to add networked Sidekick

BY JAMES DALY
CW STAFF

SCOTTS VALLEY, Calif. — Borland International will produce a network version of its Sidekick personal organizer application by first-quarter 1991, company sources said.

Like earlier versions, Sidekick 2.0 will include a notepad, an address book, a calculator and communications programs. But the new product adds a windowing and pull-down menu user interface with mouse support. It will sell for $99.95, sources said.

Although a stand-alone version will be available, Borland insiders said the chief goal with Sidekick 2.0 is to have it serve as an organizational hub. As such, connectivity support will be offered for a variety of networks, including those from Novell, Inc., 3Com Corp., Banyan Systems, Inc., IBM's Token-Ring and others that are 100% compatible with DOS Version 3.1 or higher.

The package will also provide direct links to a variety of organizer and database files and allow the exchange of data with other applications through Microsoft Corp.'s Windows dynamic data exchange.

New additions to the Sidekick package include a reconciliation feature in the Time Planner, which allows users to resolve schedule conflicts that occur, for example, when updates are made on the road via laptop and the user also has a Sidekick in the office.

Sidekick 2.0 will require only 35K bytes of conventional random-access memory because it uses expanded memory or hard disk for memory swapping.

Micro Focus Dialog System

The Human Interface Management System

MICRO FOCUS®
A Better Way of Programming™

Micro Focus Dialog System™ is a high level tool that produces and runs user interfaces for COBOL applications. Whether your application runs under OS/2 or DOS, you can develop sophisticated interfaces for a variety of styles and emerging standards, without changing your COBOL programs. Dialog System is as versatile as your needs and imagination.

Dialog System is also the best development system available for graphical and character based user interfaces to front-end your mission critical business applications.

◆ A simple CALL interface is the link between your COBOL programs and Dialog System. Writing long, complicated user interface code in COBOL will become a thing of the past.

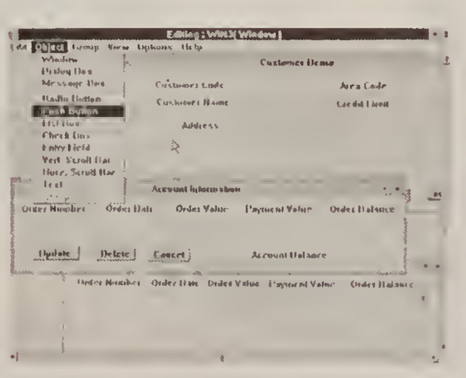
◆ Smaller, maintainable code will result from using Dialog System. The user interface is defined and run independently of the main COBOL program.

◆ Prototyping is simplified because you don't have to begin writing the data processing part of your application until after the interface is tried and tested.

◆ Testing support is provided in Micro Focus ANIMATOR™ as well as the Dialog System utilities Trap and Trace.

◆ Preserve your COBOL investment by using Dialog System to create the user interfaces you need and users want without learning new languages.

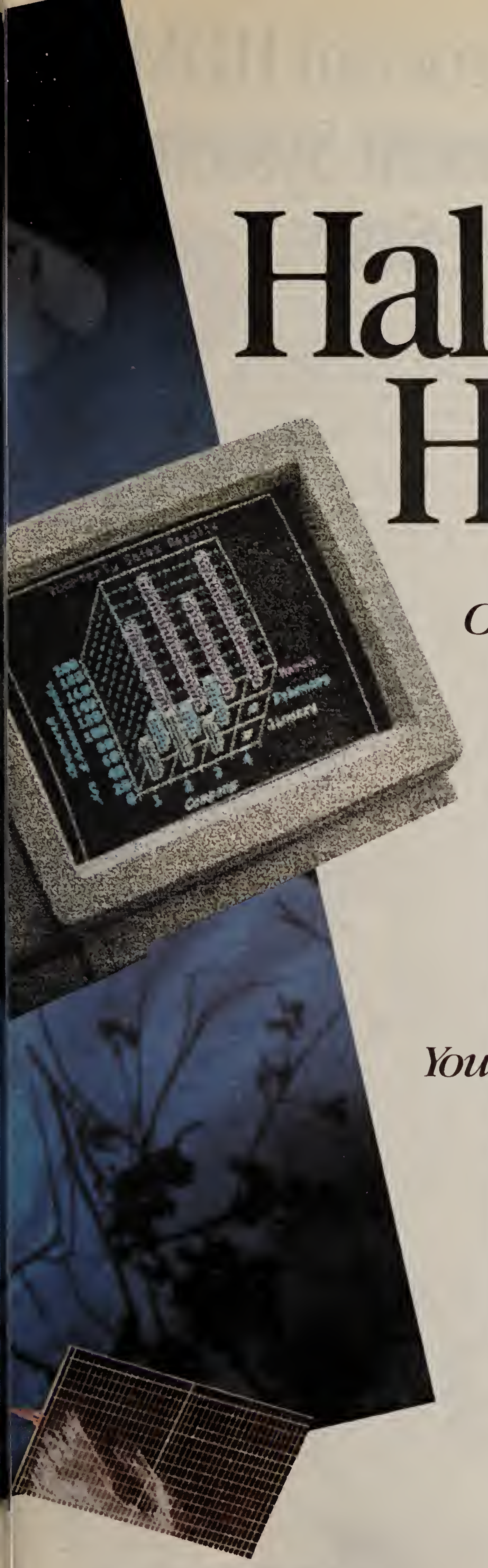
Bring the look and feel of the 90's to your applications with Micro Focus Dialog System.



The Early User Program version of Dialog System 2 gives easy access to Presentation Manager or SAA CUA objects.

For more information about Dialog System 1.1 or Early User Dialog System 2, call Micro Focus today at 1-800-872-6265 or 415-856-4161.

WHILE YOU WERE OUT
CALLED TO SEE YOU
WANTS TO SEE YOU
RETURNED YOUR CALL
URGENT
Call before 12



Half Network, Half Beast

Or, How You Can Tame Out-Of-Control Communications.

In the communications jungle, you'll find a beastly assortment of computers and phones. And networks of every species. An electronic menagerie that has to be tamed to be useful. To do the things you want. No matter what Mother Nature (or Father Time) throws at it. That's where your local phone company and AT&T come in. Using an AT&T 5ESS® Switch and AT&T Fiber, your local phone company can teach your existing networks tricks you never thought possible. Like making them connect and talk to each other. In short, with AT&T, your local telephone company can make your networks heel to your every command.

Real-World Solutions From Your Local Phone Company and AT&T

AT&T
Network Systems

© 1990 AT&T

When you stack up the Microcom HDMS Dial-up Network Management System, you rack up the benefits.*

* Easily Expandable.

HDMS's high density design makes it easy to handle growth in your network. You can grow from one to six chassis, with 32 modems per chassis, conserving critical computer-room space.

* High Speed, Error-free Transmission.

Dial-up speeds up to 38,400 bps are available, 100% error-free, keeping line charges at a minimum, and port availability at a maximum.

* Complete System Control.

Reports and monitors tell you who's using the network, when they're using it, and how well it's working — giving you complete control.

* Sophisticated Security.

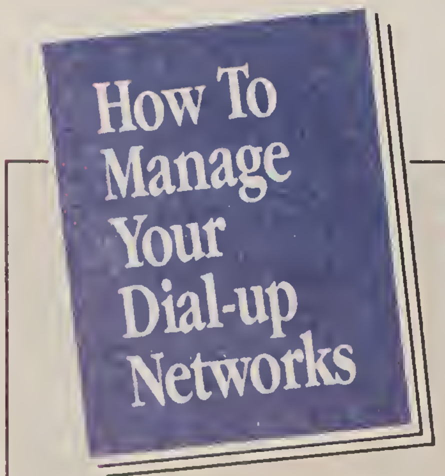
Passthrough, Variable/Fixed Call-back, and Microcom's exclusive MNP Password Connection Security™ help make your host virtually hacker-proof.

* Multiple Host Access.

Port grouping lets you assign multiple hosts to a single chassis or system, providing least-cost call routing, space/cost savings and control of user access.

* Compatible Modems.

Integrated V.32, V.29FT, V.27, V.22bis, V.22, Bell 212A and Bell 103 modems deliver up to MNP Class 9 with V.42 compatible error correction. Works with standard, popular modems.


How To Manage Your Dial-up Networks

* Free Report.

To find out how HDMS can help you manage your network more efficiently and effectively, just call for this free report, "How to Manage Your Dial-up Networks".

Call toll-free, 800-822-8224 today.

Workstation
Connectivity
Worldwide

Microcom

500 River Ridge Drive, Norwood, MA 02062 617-551-1000
Telex 710-336-7802 MICROCOM NWD / USA FAX: 617-551-1006
Worldwide Distribution — International FAX: 617-551-1007
Toll Free 800-822-8224

MNP® is a registered trademark of Microcom Inc. HDMS, HD V32c and MNP Password Connection Security are trademarks of Microcom, Inc.

Magellan: Strong text searcher, weak DOS shell

Technology Analysis — a roundup of expert opinion about new products.

With Release 2.0, Lotus Development Corp.'s Magellan joins other DOS shells in offering a variety of disk management utilities. While these additions receive some credit, Magellan's original features — text searches and file viewers — remain its greatest strengths, according to reviewers at the leading personal computer laboratories and publications.

In addition to menuing, file deletion, undeletion and backup, Lotus has added a widely praised Zip compression program that allows users to view or transfer a group of files as a single, compressed file, which can then be "unzipped" back into the original files at any time.

Magellan's text search capabilities allow users to find information anywhere on a hard disk within a matter of seconds. These have been enhanced by support for 40 different file formats, up from 10 in Version 1.0.

Reviewers are less enamored of Magellan's directory function. Lacking a true directory tree, the screen display was described by *PC World* as "clumsy and not very configurable." Another common complaint from reviewers was Magellan's lack of mouse support.

Magellan requires 512K bytes of random-access memory. For $139, Magellan offers ultrafast text retrieval and versatile file viewing. Users with heavy requirements in these areas and less need for utilities will find that this shell fits the bill.

The Magellan summary was compiled by Computerworld *intern Derek Slater.*

Score calculations: *Published reviews: average of available numeric scores from reviews multiplied by a factor of 3. Analysts' ratings: average of 1-to-10 rating from product analysts multiplied by a factor of 2. Users' ratings: average of 1-to-10 rating from major users multiplied by a factor of 1.5. Cost evaluation: average of users' and analysts' ratings of the cost to get a product up and running multiplied by a factor of 2. Vendor financials: average of 1-to-10 rating from analysts on the health of a firm and product sales multiplied by factor of 1.5. The 1-to-10 scale: 1 is poor, 10 is excellent. Criteria are weighted in favor of expert opinion and most important areas.*

Reviews Summary

Criteria	Infoworld	PC Magazine	PC World
	5/28/90	6/12/90	7/90
Ease of use	Very good	Good	Fair
File manager	NC	NC	Excellent
File viewer	NC	Far ahead of competition	Excellent
Documentation	Good	NC	NC
Technical support	Very good	NC	NC
Value	Very good	Good	Good
Reviewer's score	7.8*	Robust	NC

**Ratings are based on weighted scale of 1 to 10 where 10 is excellent. Only the* Infoworld *rating is included in score chart above. NC: No comment. These are excerpts from the reviews. Refer to actual articles for details*

Lotus Magellan

score: 75

Points (maximum)	Category
23 (30)	Published reviews
14 (20)	Analysts' ratings
12 (15)	Users' ratings
14 (20)	Cost evaluation
12 (15)	Vendor financials

(Overall maximum score: 100)

RATINGS

What the experts say

Using a 1-to-10 scale, users and analysts rated product performance and cost to get the product up and running. Financial experts rated vendor and product sales.

- Users: Frank Nestor, Summit Consulting, Inc. (*performance:* 6, *cost:* 6); Greg Saddler, WKLS Radio (10,10); Steven Frankel, Adams Harkness & Hill, Inc. (9,10).

- Analysts: Dean Hiller, D.A. Hiller & Associates (7,6); Andrew Seybold, Dataquest, Inc. (8,8); David Chernicoff, National Software Testing Labs (7,4).

- Financial analysts: Steven Frankel, Adams Harkness & Hill (10); David Readerman, Shearson Lehman Brothers (7); Alfred Tobia, Mabon Nugent & Co. (7).

- Lotus earned $67 million net income on $556 million revenue last year. The vendor does not release figures on number of copies of Magellan sold.

- "Lotus is a cash-rich company. While this year's results are below what investors expected, it's still a very good year. The installed base is faithful; there haven't been mass defections," said Adams Harkness & Hill's Steven Frankel.

Lotus responds

Comments from Will Reynolds, general manager at Magellan:

With 2.0, we wanted to offer the most used utilities within our simple interface.

The directory is straightforward once users realize the left and right arrow keys are all they need to navigate through the hierarchy.

We felt it was more important to maintain consistency with our simplifying mechanism (list of files on the left, contents on the right) than to construct a tree.

Lotus plans to eventually introduce a "Bonus Viewer Disk," free to registered users. It will include seven new file viewers and mouse support.

Prefer a TSO-style editor? Try a Free DOS or OS/2 demo!

SPF/PC® and SPF/2™

Here are two great editors to meet your needs whether you're working in DOS or OS/2. And, here's a great deal for you too — free, real-working-code demo disks that faithfully recreate the ISPF/PDF editing environment.

In DOS, **SPF/PC** has been providing MVS and COBOL programmers with that same familiar environment for more than six years.

SPF/PC was the first PC editor to bring large-file editing to the PC. With it's virtual addressing feature, **SPF/PC** allows you to edit files as large as the free work space on your hard drive, extended or expanded memory. **SPF/PC** also provides you with:

☐ directory lists
☐ Command stacking
☐ Binary editing
☐ 43-line EGA support
☐ True split screen
☐ Picture strings
☐ Hexadecimal editing
☐ 50-line VGA support

In OS/2, **SPF/2** provides an even more seamless migration from mainframe to PC, keystroke for keystroke, with true mainframe compatibility, superior PC-processing speed, macros and 3270 emulation.

SPF/2 makes it possible to pull your applications together with its interface to IBM's SAA "glue language," REXX. And, if you already have REXX edit macros on your mainframe, you can download these to the PC to run with **SPF/2**.

For **SPF/2**, there's a new, cost-effective, Multi-User License for purchase from CTC only. For information, call the contract administrator at (800) 336-3320.

Try **SPF/PC** and **SPF/2** for yourself. A free demo is yours for the asking! Just call the toll-free, 24-hour Demo Request Hot Line at **(800) 648-6700** and mention you saw this offer in the Dec. 3 *Computerworld*.

CTC® Command Technology Corporation
1040 Marina Village Parkway, Alameda, CA 94501
Telephones: (415) 521-5900 (800) 336-3320
Telefax: (415) 521-0369 *Telex* 509330 CTC

In a hurry? Call the Demo Request Hot Line at (800) 648-6700.

Users seek breathing room in upgrade avalanche

One way to find order in the upgrade process is to obtain a negotiated support agreement

BY PATRICIA KEEFE
CW STAFF

NEW YORK — As the desktop application market rapidly segues into the "upgrade decade," users are starting to look for an easier way to manage and control the growing deluge of new releases and enhancements.

"Virtually every major upgrade we've seen lately has been marked by Keystone Kop screwups — which buyers don't think are funny anymore," said Jeffrey Tarter, editor of the "Softletter" newsletter, in a recent issue. For example, sometimes the new release of software lacks compatibility with the file structure of the previous release — no minor issue for users. When this happens, what recourse do users have?

Cutting back on upgrades is not considered a serious option, even though microcomputer managers such as Alex Kask, who also serves as treasurer for the Microcomputer Managers Association, Inc. (MMA), have "serious questions whether even a tenth of my software upgrades are worthwhile."

Many end users said they feel compelled to at least purchase each successive upgrade for each package whether they want to or not, mostly out of fear of being penalized should they choose to upgrade with a later release.

The "penalty" can come in the form of higher costs, a more difficult upgrade or dropped support for the older version, said Stephen Ferranti, a vice president of marketing at The Taylor Group, a Bradford, N.H.-based firm specializing in accounting software.

Rarely is it feasible to switch to another application standard. However, Gartner Group, Inc. analyst Leslie Fiering, a former microcomputer manager and MMA member, maintained that users are in the driver's seat more often than they realize.

Still, the best that resigned users hope for is an orderly migration to the new releases. One approach that is currently beginning to emerge is a negotiated support agreement, a tactic the MMA recommended three years ago in a white paper on software upgrade issues.

A negotiated support agreement is not a site license or volume purchase agreement. What it does do, according to the MMA, is provide the structure necessary for policies that can simplify the upgrade process, jettison copy protection and facilitate the transfer of information among vendors and users on bugs and bug fixes.

Any support agreement worth its weight in lawyers should also cover user/vendor communications, pricing, software distribution and documentation, legal rights of both parties, ownership and technical development issues.

SOMETIMES THE new release of software lacks compatibility with the file structure of the previous release — no minor issue for users.

The MMA divides a negotiated support agreement into five areas: upgrades, bugs and bug fixes, copy protection, copying of documentation and "other."

Users should demand the right to continue to purchase older releases of software and receive extended support for those versions. They should maintain the right not to return system disks. Annual maintenance fees should cover the price of all upgrades released by the vendor within the year.

The MMA also recommends that users try to establish a corporate upgrade path that will allow companies to skip several intermediate upgrades, for example, going from Release 1 to Release 4.

Recognizing that many upgrades are really bug fixes, the MMA suggested that users negotiate access to an electronic bulletin board that provides information on bugs and fixes. As backup, it is recommended that users request notification by mail of the same information as well as regular information about fixes, patches and "workarounds."

Users are urged to request noncopy-protected software and the ability to brand software with the user's name and company logo, which in turn would give firms a tool to discourage illegal copying of software.

One problem associated with mass upgrades is that often there are not enough copies of the documentation to go around. The support agreement can guarantee the right to duplicate or electronically distribute documentation.

Other benefits that the MMA recommended users negotiate with their vendors include the following: specialized technical newsletters for corporate support staff, technical hot lines staffed by vendor experts, long-term strategic information on products, network licenses, technical training and application development support.

IF WE'VE SOLD IT ONCE, WE'VE SOLD IT 2,000 TIMES.

We don't mind repeating ourselves. In fact, when the repetition involves sales of the StorageTek 4400 Automated Cartridge System, we're absolutely delighted. In just 2½ years, we've installed 2,000 of our revolutionary information storage libraries. By the way, number 2,000 went to Automobiles Citroën—member of Peugeot Group, giving us a total of 100 libraries in France. Citroën and the other 699 recipients of the 4400 ACS have discovered our Nearline® technology offers access to up to 96,000 cartridges at nearly the cost of offline but nearly as fast as online. They've discovered the benefits are also delivered with unheard-of speed—greater productivity, more efficient operations, reduced disk-storage expenditures and lower overall storage costs.

And while many companies have scrambled to establish a presence in this category, StorageTek has left every one at the starting line. That's just one reason we'll reach a second numeric milestone this year—one billion dollars in revenues. If you'd like to find out what the 4400 ACS can do to improve your mainframe or super-computer environment, call us at 1-800-456-7689. We'll give you 2,000 reasons to become our customer. But hurry, before your competition becomes number 2,001.

StorageTek.

Introducing a new concept in software with a name that says it all. . .
ACCESS
MANAGE
DATA
PRESENT
AN

What's in a name?

Plenty. Especially when the name is the SAS System...the most popular applications system in the world. Over the years, it has come to symbolize reliability, power, and productivity.

The NEW SAS® System

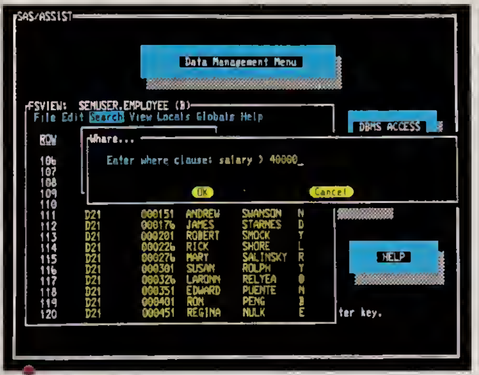
The world's #1 applications system

And now the SAS System means even more. It means you have the flexibility to choose software from an *applications* point-of-view instead of a hardware point-of-view. It means you can master the four key data-driven tasks — data access, management, analysis, and presentation — through a single software system. It means you can extend applications to more computer users, regardless of experience level. And it means you'll be the beneficiary, not the victim, of emerging computing technologies.

We've put the emphasis on the end results.

With the SAS System, it doesn't matter who's running an application. Or how. Or where. You can approach the SAS System from any experience level in just about any environment and be assured of the same reliable results.

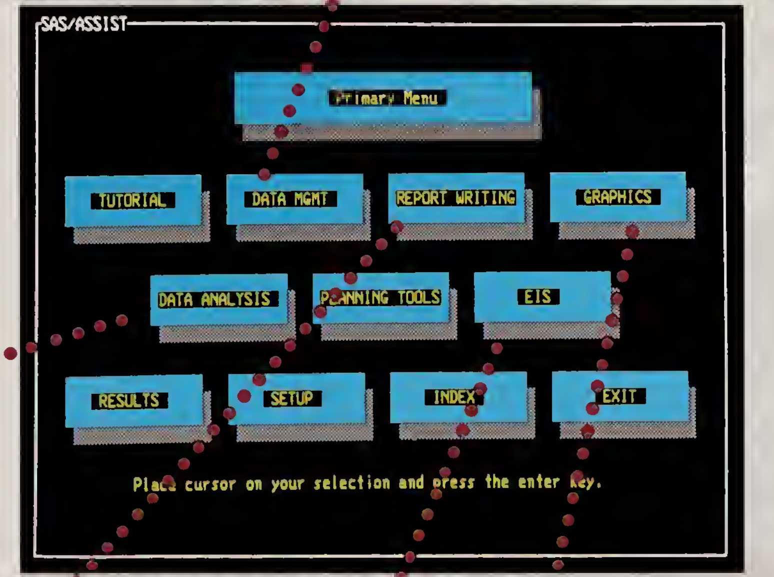
We've designed the SAS System to be equally responsive to both inexperienced users and power users. At the very center of our new release is a task-oriented, menu-driven user interface.


SAS/ASSIST
Data Management Menu
FSVIEW: SEMUSER.EMPLOYEE (B)
File Edit Search View Locals Globals Help
DBMS ACCESS
HELP
Where...
OK
Cancel

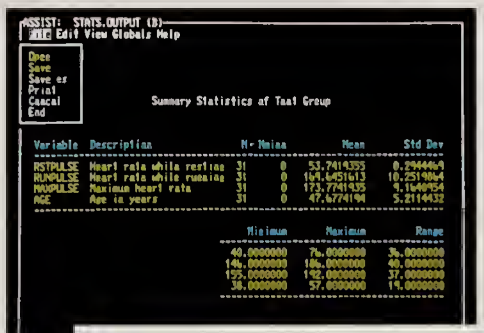
```
Enter where clause: salary > 40000_
```

```
ROW
106
107
108
109
110
111   D21   000151  ANDREW   SWANSON   N
112   D21   000176  JAMES    STARNES   D
113   D21   000201  ROBERT   SMOCK     Y
114   D21   000226  RICK     SHORE     L
115   D21   000276  MARY     SALINSKY  R
116   D21   000301  SUSAN    ROLPH     Y
117   D21   000326  LARONN   RELYEA    O
118   D21   000351  EDWARD   PUENTE    N
119   D21   000401  RON      PENG      B
120   D21   000451  REGINA   NULK      E
```

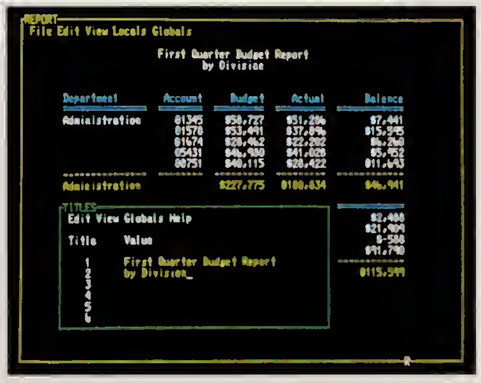
ter key.



Place cursor on your selection and press the enter key.



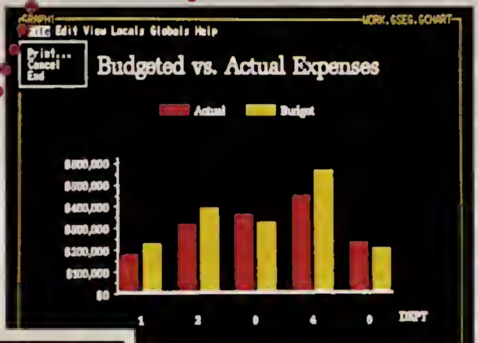
```
                Summary Statistics of Test Group

Variable  Description                 N  Nmiss         Mean       Std Dev
-------------------------------------------------------------------------
RSTPULSE  Heart rate while resting   31     0   53.7419355     8.2944464
RUNPULSE  Heart rate while running   31     0  169.6451613    10.2519864
MAXPULSE  Maximum heart rate         31     0  173.7741935     9.1640954
AGE       Age in years               31     0   47.6774194     5.2114432
-------------------------------------------------------------------------

                                   Minimum       Maximum         Range
                              -------------------------------------------
                                40.0000000    76.0000000    36.0000000
                               146.0000000   186.0000000    40.0000000
                               155.0000000   192.0000000    37.0000000
                                38.0000000    57.0000000    19.0000000
                              -------------------------------------------
```

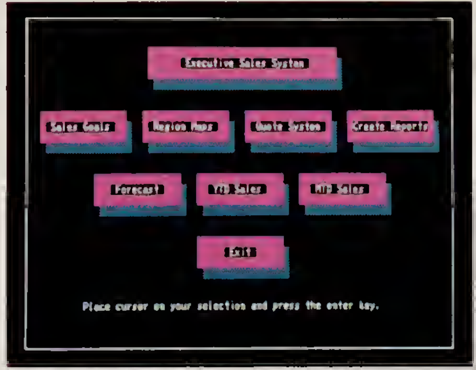


```
                  First Quarter Budget Report
                          by Division

Department        Account     Budget     Actual      Balance
Administration      01345    $58,727    $51,286       $7,441
                    01570    $53,491    $37,896      $15,595
                    01674    $28,462    $22,202       $6,260
                    05431    $46,480    $41,028       $5,452
                    08751    $40,115    $28,422      $11,693
--------------             ---------  ---------  -----------
Administration              $227,775   $180,834      $46,941

                                                      $2,400
                                                     $21,909
                                                       $-508
                                                     $91,790
                                                 -----------
                                                    $115,599
```

```
Title    Value

  1      First Quarter Budget Report
  2      by Division_
  3
  4
  5
  6
```

It's never been easier to access, manage, analyze, or present data. You can even build your own executive information systems.





Place cursor on your selection and press the enter key.

The menus, powered by keywords, make it even easier to run the SAS System's most widely used applications. Without having to know a word of syntax, users can access a data base...read in data...perform analyses ranging from simple statistics to specialized applications such as forecasting, project management, and quality improvement...and generate a variety of reports and graphs.

If you're approaching the SAS System from an applications development viewpoint, you'll find all the capabilities you'd ever expect in a powerful and productive programming environment. And then some.

There's a command-driven interface especially for systems analysts, applications developers, MIS personnel, and the Information Center staff.

From this interactive windowing environment, you can use the SAS System's English-like commands to build applications in a fraction of the time. And you can customize any application any way you choose by adding user-friendly menus and fill-in-the-blank screens.

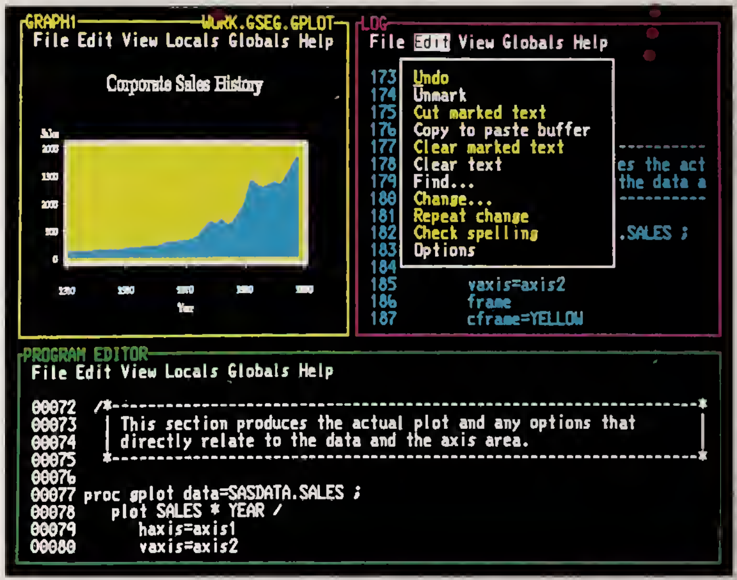
We've made sure you'll never get boxed in.

While the industry struggles to define a common operating environment, the SAS System eliminates the need for one.

Our exclusive MultiVendor Architecture™ gives you the power to decide where a particular application belongs — in the data center, at the departmental level, on the desktop, or a combination of all three. The SAS System, and the work you do, is portable across the entire range of computing environments.

A dynamic programming interface lets you customize your development environment. As your program takes shape, so do the results.

Monitor programs as they execute. Pull-down menus make editing, file management, and other essential programming tasks easy.



```
-----------
es the act
the data a
-----------

.SALES ;

        vaxis=axis2
        frame
        cframe=YELLOW
```

```
/*------------------------------------------------------------*
 | This section produces the actual plot and any options that |
 | directly relate to the data and the axis area.             |
 *------------------------------------------------------------*

proc gplot data=SASDATA.SALES ;
   plot SALES * YEAR /
      haxis=axis1
      vaxis=axis2
```

Directly access and manipulate the SAS System's English-like command language.

Prime

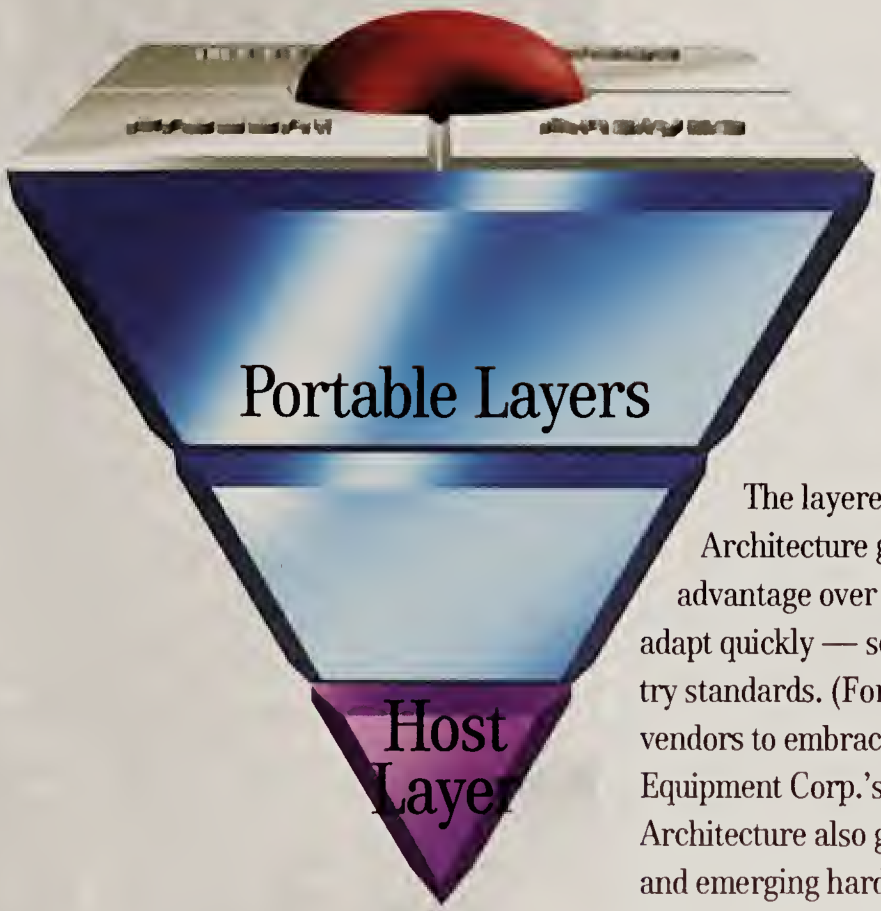
Silicon Graphics
The 3D Computer Company

digital
Cooperative Marketing Program

IBM
Business Partner
Authorized
Cooperative
Softwa
Su

sun
microsystems

Catalyst
Advanta
Progra



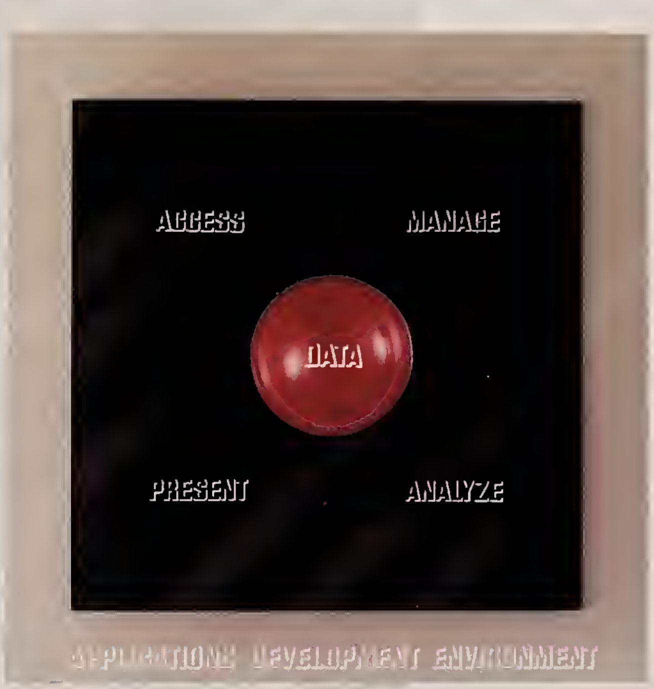
The layered approach of our MultiVendor Architecture gives the SAS System a unique advantage over other software. The SAS System can adapt quickly — sometimes instantly — to new industry standards. (For instance, we were among the first vendors to embrace both IBM Corp.'s SAA and Digital Equipment Corp.'s NAS in one system.) MultiVendor Architecture also gives you the freedom to exploit new and emerging hardware technologies — such as DECwindows,™ X Windows, Presentation Manager,™ and other native windowing interfaces — without worrying about your existing inventory of applications.

With the SAS System, you'll always have state-of-the-art software for state-of-the-art equipment. You'll never again be boxed in to a particular hardware platform.

And that's a promise.

SAS software lets you stay on the leading edge of such new technologies as native windowing.

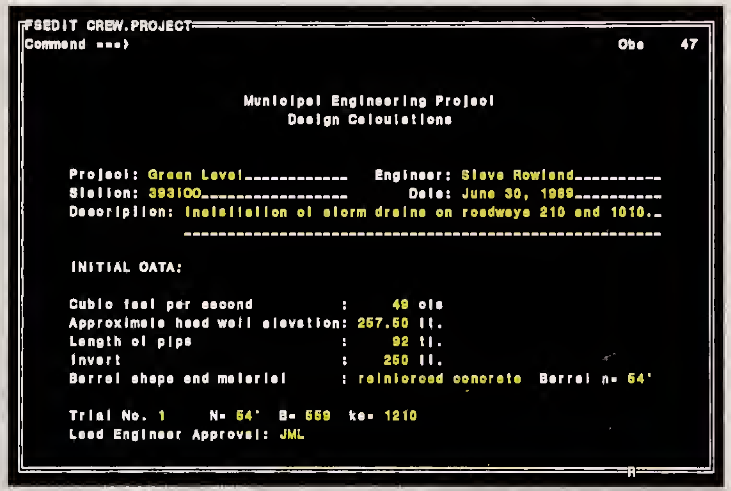
We've given you total control in four strategic areas.



There are four data-driven tasks common to all your computing applications. We've designed the SAS System with these tasks in mind.

The first task is to identify and *access* the data you need. With the SAS System, you'll find direct and transparent interfaces between your applications and the most popular data base management systems such as DB2, SQL/DS,™ ORACLE,® Rdb/VMS,™ Lotus 1-2-3,® dBASE,® and SYSTEM 2000.® You can get your hands on data without having to know data base terminology, and without sacrificing data base security. What's more, the SAS System's support of SQL™ gives programmers a standard language for data query. The SAS System can also be used to access raw data files in any format — even files with messy or missing data.

But getting data from place to place is just part of the challenge. Data *management* is also key, and the SAS System responds with efficient ways to enter new data... edit and query data files... and manipulate your data. You can even merge data from totally different kinds of files. And your inexperienced users can enter their data through customized fill-in-the-blank screens that look exactly like your business forms.

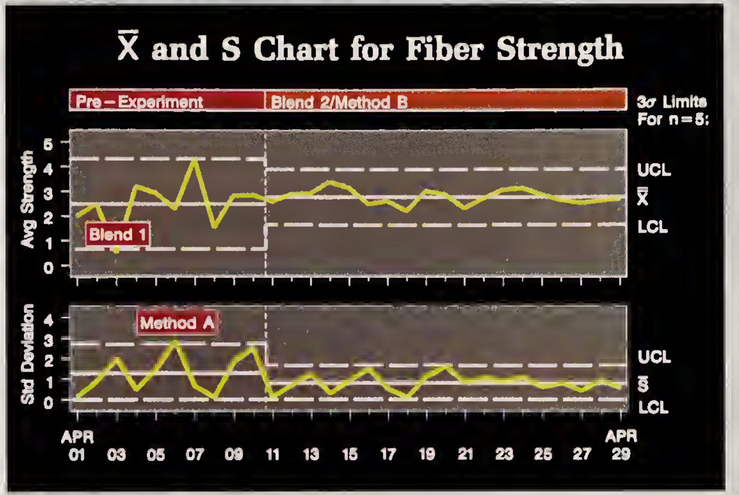


```
FSEDIT CREW.PROJECT
Command ===>                                                    Obs     47

                    Municipal Engineering Project
                         Design Calculations

   Project: Green Level____________   Engineer: Steve Rowland_________
   Station: 393100_________________       Date: June 30, 1989_________
   Description: Installation of storm drains on roadways 210 and 1010._
                __________________________________________________________

   INITIAL DATA:

   Cubic feet per second          :     49 cfs
   Approximate head wall elevation: 257.50 ft.
   Length of pipe                 :     92 ft.
   Invert                         :    250 ft.
   Barrel shape and material      : reinforced concrete  Barrel n= 54'

   Trial No. 1     N= 54'  B= 559  ke= 1210
   Lead Engineer Approval: JML
```

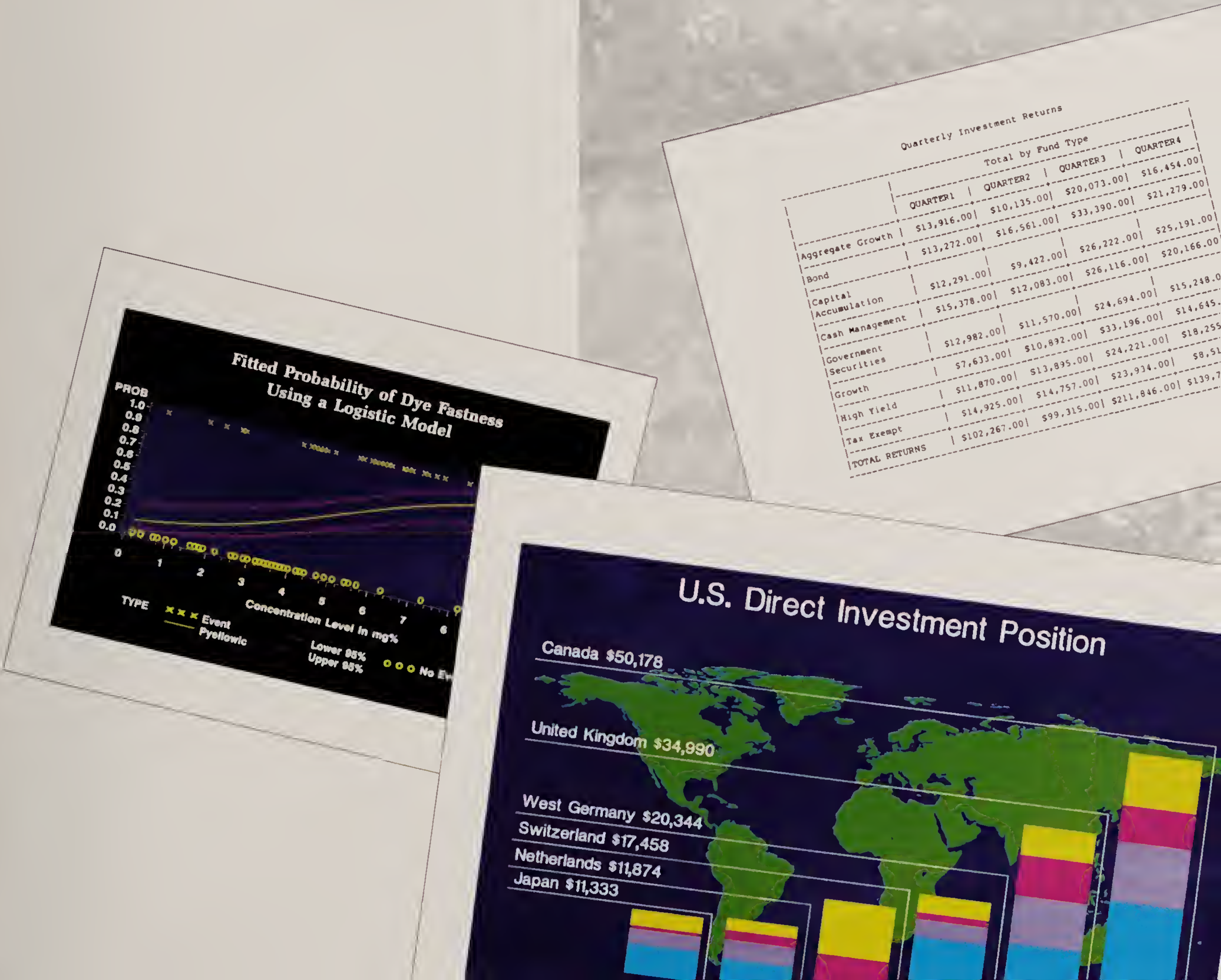
Users can take a common-sense approach to data entry using fill-in-the-blank screens.

Turning data into meaningful information has always been a hallmark of the SAS System. And now you'll find more ways to *analyze* data than ever before... everything from descriptive statistics to advanced multivariate techniques. You'll also find specialized tools for virtually any kind of business need: planning, forecasting, electronic spreadsheets, operations research, decision support, and more. Plus the most sophisticated methods for statistical quality improvement and experimental design.

And once you have analyzed your data, the SAS System makes it easy to get the attention you, and your data, deserve. Our data *presentation* capabilities are unsurpassed — from simple printed lists to spectacular full-color graphics. Here's just a sample:



You can rely on one software to handle all your analytical needs.



Quarterly Investment Returns

	Total by Fund Type			
	QUARTER1	QUARTER2	QUARTER3	QUARTER4
Aggregate Growth	$13,916.00	$10,135.00	$20,073.00	$16,454.00
Bond	$13,272.00	$16,561.00	$33,390.00	$21,279.00
Capital Accumulation	$12,291.00	$9,422.00	$26,222.00	$25,191.00
Cash Management	$15,378.00	$12,083.00	$26,116.00	$20,166.00
Government Securities	$12,982.00	$11,570.00	$24,694.00	$15,248.0
Growth	$7,633.00	$10,832.00	$33,196.00	$14,645.
High Yield	$11,870.00	$13,895.00	$24,221.00	$18,255
Tax Exempt	$14,925.00	$14,757.00	$23,934.00	$8,5
TOTAL RETURNS	$102,267.00	$99,315.00	$211,846.00	$139,7

**The SAS® System.
More Choices
for More Applications
than Any Other Software.**

And we'll give you a free demonstration.

It's taken a thousand programming years of effort to bring you this new class of software. And we think it's been time well spent.

Now see what you think. Give us a call today at 919-677-8200 to arrange your free demonstration of the SAS System. In Canada, call 416-443-9811.

You'll learn more about the world's first true applications software system — offering you a range of capabilities no other software can match. And backed by the industry's most complete technical support, consulting services, documentation, and training. All from SAS Institute Inc., one of the world's most respected names in software.

SAS Institute Inc.
Software Sales Department
SAS Campus Drive
Cary, NC 27513
Phone 919-677-8200
Fax 919-677-8123

SAS and SYSTEM 2000 are registered trademarks of SAS Institute Inc., Cary, NC, USA. MultiVendor Architecture is a trademark of SAS Institute Inc.

Other brand and product names are registered trademarks or trademarks of their respective holders.

Copyright © 1990 by SAS Institute Inc. Printed in the USA.

Claris reworks Hypercard strategy, gives users a choice

BY JAMES DALY
CW STAFF

SANTA CLARA, Calif. — Claris Corp. sketched in more details of its Hypercard 2.0 product strategy recently, announcing that it will abandon the older one-size-fits-all configuration and allow users to choose from three different designs.

The announcement came two months after Apple Computer, Inc. transferred responsibility for the package to Claris and only weeks after the first shipments of the Hypercard upgrade.

The basic Hypercard 2.0 configuration will come free with each Macintosh and is geared toward users who run stacks — the small individualized programs that run within Hypercard — but do not create or customize them. The package allows users to browse through stacks and enter data. It includes a 35-page manual and three sample stacks. Users can also change the access level to operate within the program's highest user levels.

Claris will also offer the Hypercard 2.0 Upgrade Kit for current users who want to create and modify scripts. The five-disk upgrade kit includes more than 12 stacks that provide Hypercard Help, ready-made buttons and fields, stack templates and fonts. The upgrade kit will cost $49.

The Hypercard 2.0 Development Kit is for advanced users interested in advanced scripting and extensive documentation. The $199 package will include five manuals totaling more than 1,400 pages as well as the five disks offered in the upgrade kit. The development kit will ship in January.

The company also announced that ex-Apple software designer Bill Duval has joined Claris as director of Hypercard development. Duvall also previously served as a research scientist at Xerox Corp.'s Palo Alto Research Center in California.

Grid to supply Texas Commerce

BY JIM NASH
CW STAFF

HOUSTON — Texas Commerce Bank executives, designing their own document-imaging system to process 500,000 stored documents, have chosen Grid Systems Corp. to provide an Intel Corp. I486-based file server for the project.

Eroy Wilkins, vice president and division manager for office technology at the bank, said he will put Grid's debut file server to work on his 80-user local-area network. Wilkins and his staff will add prototyping duties to the ordinary LAN tasks as soon as the server is brought on-line.

Grid's server, the 486EI-25/SVR, was announced at Comdex/Fall '90 and will cost $11,999. It is scheduled to be available this month. It has nine expansion bays, offering up to 4G bytes of disk storage, 8K bytes of cache memory and 256K bytes of secondary cache. The Fremont, Calif., firm is a subsidiary of Tandy Corp.

"This is another step toward Grid becoming a full-service [personal computer] vendor," Gartner Group/Infocorp analyst Peter Teige said. For LAN managers who have a large Grid installed base, this move offers the possibility of a desirable single-vendor environment.

Wilkins said he chose the Grid server despite the fact that it is the first such device from a traditionally portable-focused hardware company. "Getting the file server was an important first step in the prototyping project," he explained. "There is a high degree of interest in our company to see if this would work based on our past good relationship with Grid."

Wilkins said that from what he has seen so far, Grid's system is "much faster than the 386 file servers out there."

The bank has used several of Grid's hardware products to augment its Novell, Inc. Netware LAN and Compaq Computer Corp. Systempro 80386 and 486 file servers, he said.

Nexgen to join multiplatform show

BY MAURA J. HARRINGTON
CW STAFF

SAN JOSE, Calif. — Another in a string of high-end multiplatform personal computers is expected to be introduced in the second quarter of 1991 when Nexgen Microsystems, Inc. releases an as-yet-unnamed product.

In a twist, however, Nexgen will not base its system — which will run DOS, OS/2 and The Santa Cruz Operation's Unix — on commodity microprocessors. Instead, Nexgen promises Intel Corp. I486 compatibility from its own reduced instruction set computing-based microprocessor called the Fast86.

"We are working on a system targeted for high-end server and desktop applications," said president and co-founder of Nexgen, Thampy Thomas, adding, "a high-end system that is already compatible with industry standards."

The Fast86 will sit on Nexgen's bus, called Nexbus, which has a bandwidth of 267M byte/sec. and the ability to support as much as 512M bytes of system memory on the motherboard, according to Thomas.

From a hardware standpoint, Thomas said, the processor will be compatible with the Extended Industry Standard Architecture bus and IBM's Micro Channel Architecture bus, both 32-bit architectures.

While many analysts are still unfamiliar with Nexgen's future system, Nexgen's investors include Chips and Technologies, Inc., based here; Compaq Computer Corp., based in Houston; Ascii Corp., Mitsui Corp. and Yamaha Corp., all in Japan; Ing C. Olivetti & Co., based in Italy; and Kleiner, Perkins, Caufield and Byers, a venture capital firm in Palo Alto, Calif.

WHAT DO THE FOLLOWING ORGANIZATIONS HAVE IN COMMON?

General American
UNION PACIFIC
USC
City of Phoenix

All four will share their experience with *IMAGE SYSTEM* Technology in Phoenix, Arizona, January 16-18, 1991. Why Phoenix? Simply because this will coincide with the most informative conference for companies looking to employ image system technology.

For more information on:

IMAGE SYSTEMS: BEYOND THE OBVIOUS
January 16-18, 1991
Phoenix, AZ

Call 1-800-525-5456 x-456

Sponsored by IDC/Avante Technologies, Inc., a joint venture
5 Speen Street, Framingham, MA 01701

Perhaps its best fea

Novell Labs Tested & Approved

NEC BusinessMate 386/33E.

Built with 33MHz 386™ microprocessor and EISA architecture, for high-performance networking and multiuser solutions.

If you see networking and multiuser solutions in your company's future, there's no better investment than the NEC BusinessMate® 386/33E. Because it gives you the performance, capacity and expandability these environments demand.

It comes with 4MB or 8MB of RAM, a 64KB SRAM cache, and room for three full-height and three half-height storage devices. Its 32-bit EISA architecture accepts 8-, 16- and 32-bit cards among eight

C&C
Computers and Communications

ture is its future.

expansion slots. And its NEC Host Adaptor supports up to seven SCSI devices, for increased flexibility with no sacrifice in performance.

In short, with support for thousands of applications, you'll have the power to make your system grow and change as your needs do. Best of all, you'll have a system that offers something no one else can offer at any price: NEC. Which may be the most attractive feature of all.

For more information, call 1-800-NEC-INFO.

Fully compatible with The Santa Cruz Operation® UNIX® and XENIX®. UNIX is a registered trademark of AT&T

XENIX is a registered trademark of Microsoft Corporation

Novell certification mark is a registered trademark of Novell, Inc

386 is a trademark of Intel Corporation

BusinessMate® is a registered trademark of NEC Corporation © 1990 NEC Technologies Inc

NEC

Caere unveils trainable OCR product

BY JIM NASH
CW STAFF

Adopting the stripes of competitors, Caere Corp. plans to introduce training, or matching, abilities to its line of optical character recognition (OCR) software products. But at least some users of Caere's OCR products want the company to spend more time on the basics.

Caere and other high-end OCR companies, such as Calera Recognition Systems, Inc., have made their mark with software that recognizes the structure of individual letters in numerous languages, allowing them to be identified even if they appear stylized in italics, for example. Other manufacturers have chosen a less expensive technique that has the software matching letters to a single template.

Ray Goldie, general counsel to Compulaw Ltd. and Legal Solutions, Inc., said he is anxious to receive a copy of Caere's Omnipage Professional. He now runs Omnipage 386 Version 2.0 and said the program leaves only "one or two minor editing tasks per page."

The training feature would help eliminate a few repetitive mistakes that Version 2.0 makes in reading certain broken characters, Goldie said from his office in Rancho Mirage, Calif.

Skeptical users

Other users are more skeptical. Architect Don Wheat, at Myers-NBD, Inc. in Dublin, Ohio, said he picked up Omnipage 386 Version 2.1 with a computer-aided design system and was disappointed to see what he estimated to be an 80% accuracy rate on its first few trial runs. He said he intends to give that version another audition before moving up to any new Omnipage software.

Kristy Holch, an analyst at BIS CAP International, Inc. in Norwell, Mass., said it is significant that Caere has combined character analysis and matching against a stored template. When a mathematical symbol or an incomplete letter created by a damaged but often-used typewriter is encountered, Holch said, users can save the image to a separate file for future reference by Omnipage Professional.

The Los Gatos, Calif.-based company said it will begin delivering Omnipage Professional this month for $995.

The software will be available for Microsoft Corp. DOS Version 3.1 and Windows Version 3.0 this month and Apple Computer, Inc. Macintosh systems in the first quarter of 1991, according to a company spokesman.

MICRO NOTES

Shaw, Lotus sign agreement

Shaw Data Services, Inc., a supplier of portfolio management systems, has signed a joint marketing pact with **Lotus Development Corp.** The two will cross-sell Shaw's mainframe-based on-line service with Lotus' One Source personal-computer-based business and financial databases.

Commodore Business Machines, Inc. has announced a $25 rebate good through Jan. 31 to purchasers of its Amigavision icon-based multimedia authoring system.

Easel Corp. and **Wang Laboratories, Inc.** are collaborating on the development of a communications module that will enable the Easel graphical application development system to talk with Wang's midrange VS systems. The resulting product is slated to ship in the first quarter of 1991 and will be sold in conjunction with the Easel/DOS Development System.

Novell, Inc. has announced a version of the Netware Requester for OS/2, which will allow users of **IBM**'s OS/2 Version 1.3 to access Netware services. It will be available on Netwire, Novell's on-line information service, two to four weeks after OS/2 version 1.3 ships.

Scanner

FROM PAGE 51

memory that scans documents and then processes them into ASCII code as a background job.

OCR, which is also called matrix matching, is the software function that compares the scanned font to stored examples and outputs the appropriate ASCII code.

A more sophisticated approach, intelligent character recognition (ICR), extracts certain features from a scanned character or symbol and looks for a mix of elements that distinguishes it from other characters. This approach, called feature extraction or pattern recognition, is more flexible since it is font-independent.

However, a persisting problem with both OCR and ICR is high user expectations. "The toughest battle in the industry is that you can't get to 100% accuracy," Crandall said. The issue is more subtle, he insisted, and calls for an analysis of the applications and a judgment about "where there's a break point between accuracy and speed."

Crandall charged that comparisons of scanner speeds are often based on scanning of laser-printed documents.

Gregory Van Buren, a consultant at Arthur D. Little, Inc. agreed.

"The input function seems to be a real bottleneck in document image management systems," he said. Especially problematic and expensive, Van Buren said, is the process of capturing existing paper or microfilm archives into an imaging system.

It's the fastest
But it will never cat

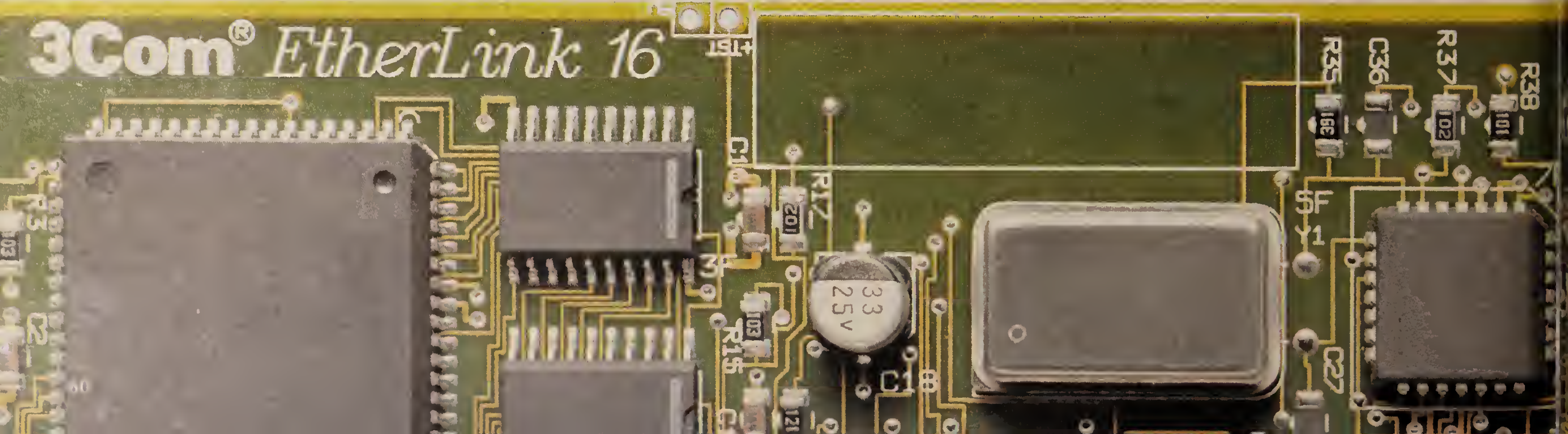
You can go fast. You can go safe. Just not together. Until EtherLink® 16.

This 16-bit Ethernet network adapter is up to 90 percent faster than its major competitors.* Yet it runs with a lifetime warranty.

You can use it with your IBM PC, XT, AT, PS/2 Model 25 or 30 and compatibles, as well as EISA computers. And it's ready to run on NetWare, LAN Manager and 3Com® 3+Open.™

What's more, EtherLink 16 is speedy to install,

*An independent laboratory, LanQuest Group, did the testing, and you can get a copy of their glowing report on speed by calling us at 1-800-NET-3Com. You can also request the data on reliability, and learn why that of two million 3Com adapters in use, 99.5 percent have never needed repair.



NEW PRODUCTS

Software applications packages

Visix Software, Inc. has announced an upgrade to its graphical user environment for Unix-based workstations and X Window System-based terminals.

Looking Glass Version 2 provides users with a graphical tree view feature that facilitates file system navigation and a command line window that enables users to edit and submit commands to a shell directly from the Looking Glass application.

The product is scheduled to begin shipping this month. Pricing ranges from $595 to $1,295, depending on type of platform.

Visix Software
11440 Commerce Park Drive
Reston, Va. 22091
(703) 758-8230

Chipsoft, Inc. has announced the latest version of Turbotax, its tax preparation and planning software package, which was designed for IBM Personal Computer XTs, ATs and compatibles, as well as Apple Computer, Inc. Macintosh machines.

The product includes a logical next-step feature that uses pop-up windows to guide users through each tax preparation step, the vendor said.

The product also features reworded menus that facilitate command selection and additional tax forms, including Schedule 3 and Forms 4137, 4868, 8822, 8453 and W-4.

A PC version costs $75, and 44 state programs are available for $40 each. Pricing for the Macintosh version is $89, and 11 state versions are currently available for $49 each.

Chipsoft
6256 Greenwich Drive
San Diego, Calif. 92122
(619) 453-4446

Data storage

Brier Technology has announced a backward-compatible version of Flextra, its high-capacity standard floppy disk drive.

The 25M-byte device fits into a standard 3½-in. half-height slot and can be adapted to fit a 5¼-in. slot.

According to the vendor, the disk drive features an integrated drive electronics interface or small computer systems interface, both of which can be integrated with IBM Personal Computer XTs, ATs or compatibles as external or internal add-on devices.

The drive is priced at $300 in OEM quantities.

Brier Technology
25 Meca Drive
Norcross, Ga. 30093
(404) 564-5550

Chinon America, Inc. has announced Model CDC-431, a compact disc/read-only memory drive that features built-in remote CD audio control and digital display units.

The drive features an average access speed of 350 msec or a mean time between failure rate of 25,000 hours, the vendor said. It can operate with an IBM Personal Computer or an Apple Computer, Inc. Macintosh.

The drive is priced at $895 and is slated to be available next month.

Chinon America
660 Maple Ave.
Torrance, Calif. 90503
(213) 533-0274

Board-level devices

American International Devices, Inc. has announced a 24M-byte board that incorporates 4M-bit dynamic random-access memory chips.

The AI/1217 memory module is available for Unisys Corp.'s A-12, A-15 and A-17 machines. Its 24M-byte memory can be expanded to 48M, 72M and 96M bytes for use on Unisys A Series machines that can accommodate large-capacity boards, the vendor said.

The board costs $110,000.

American International
Devices
12540 Beatrice St.
Los Angeles, Calif. 90066
(213) 305-8161

Industrial Computer Source, Inc. has announced an Intel Corp. 80286-based CPU card that is compatible with IBM Personal Computer ATs.

Model SB286CS is a single plug-in board equipped with a CPU, random-access memory, read-only memory, I/O ports and an optional math coprocessor, the vendor said.

The product also features a built-in IBM Video Graphics Array video adapter that supports analog monitors as well as a floppy controller that supports dual-speed 3½- and 5¼-in. disk drives.

Prices range from $895 to $1,495 for 512K-, 1M-, 2M- or 4M-byte versions.

Industrial Computer Source
4837 Mercury St.
San Diego, Calif. 92111
(619) 279-0084

Lasergo, Inc. has begun shipping a memory board with its Goscript software as a bundled package priced at $295.

The board was designed for the Hewlett-Packard Co. Laserjet Series IIP and III and comes equipped with 1M byte of memory, which can be expanded to 4M bytes.

Goscript enables users to print Postscript language files on all of HP's laser printers.

According to the vendor, the product features 13 scalable fonts, requires 640K bytes of random-access memory and runs on an IBM Personal Computer AT, XT or compatible as well as on IBM Personal System/2 computers.

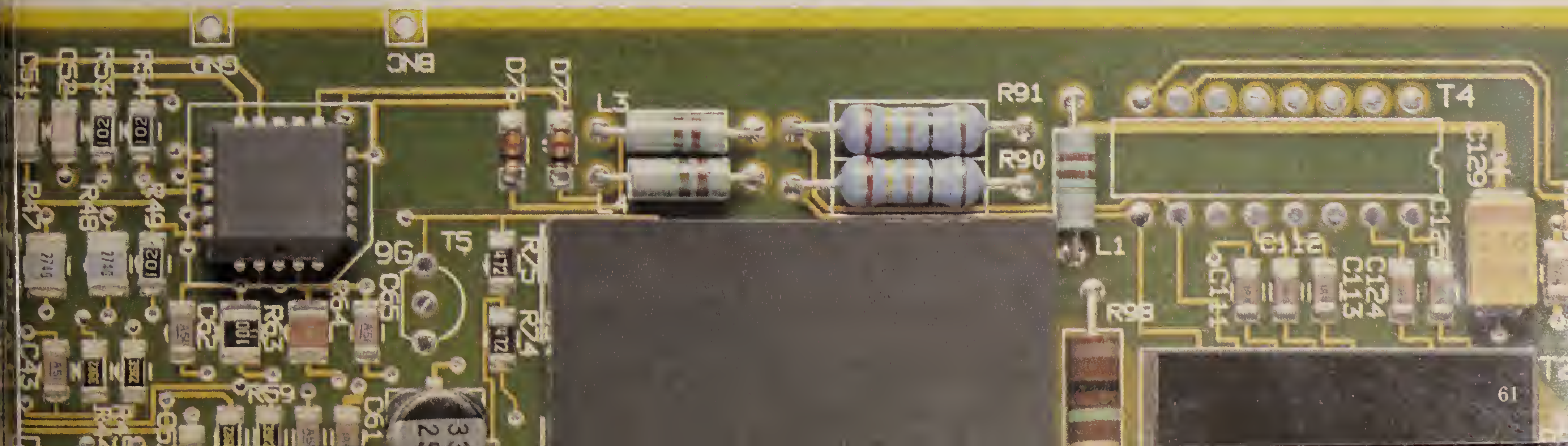
Lasergo
9369 Carroll Park Drive
San Diego, Calif. 92121
(619) 450-4600

board available.
ch up to its warranty.

because there are no jumpers to slow you down.
But why not see for yourself?
Just call **1-800-NET-3Com** Dept. D5056 for the name of your nearest 3Com reseller.

3Com®
We network more types of systems to more types of systems.™

©1990 3Com Corporation, 5400 Bayfront Plaza, Santa Clara, CA 95052. Telephone (408) 764-5000. 3Com, 3+Open, EtherLink and the 3Com tagline are trademarks of 3Com Corporation. IBM, XT, AT and PS/2 are trademarks of International Business Machines Corporation. NetWare is a registered trademark of Novell, Inc. LanQuest is a trademark of LanQuest Group.



"At St. Jude, we're caring for children with cancer. We need a network that can care for itself."

"Only BANYAN could have done it."

From an interview with Albert Herrington,
St. Jude Children's Research Hospital.

"We don't want a big network administration staff. We're a research hospital dedicated to catastrophic childhood diseases, and that's where the money goes."

What problems did you face?

"The worst problem was the conglomeration of hardware to be tied together. Everything from PC ATs to DEC VAXs and an IBM AS/400. That, and continuous moves as we remodel and expand the facilities."

Whose network operating software did you evaluate?

"Everyone's, it seems. IBM's, AT&T's, Novell's, Banyan's and 3Com's."

How does St. Jude feel about choosing Banyan's VINES® now?

"We're extremely pleased. VINES' StreetTalk® feature has made moving people easier because you can reach them anywhere, anytime on the network without having to know their specific server. And since VINES is so reliable, we can concentrate more time on application development and helping our users take full advantage of the network."

Banyan's VINES network operating software can make organizations of all sizes more productive, while minimizing operating costs. For a further description of St. Jude's networking problems and real-life solutions, write or call us at 800-828-2404 (in MA 508-836-2828).

BANYAN®

Networking. Without limits.

Copyright © 1990 Banyan Systems Incorporated, 120 Flanders Road, Westboro, MA 01581

Bank merges DEC and IBM links

ON SITE

BY ELISABETH HORWITT
CW STAFF

NEW YORK — As part of a major data center consolidation move now under way [CW, Nov. 12], a group at Manufacturers Hanover Trust Co. is exploring how to maximize computer resources by allowing users to access both Digital Equipment Corp. VAXs and IBM Application System/400s from the same workstation.

The financial firm's global banking communications group "grew up as a DEC data center" but now has two AS/400s and plans to install seven or eight next year, according to Patrick Molloy, assistant vice president of the recently formed group.

The AS/400s were bought because the group wanted access to certain applications that run on those systems, Molloy said. "Our approach is to buy the box for the application; there is no move to standardize on one type of system."

In addition to the AS/400s in New York, Molloy's group has 10 assorted DEC VAXs and Microvax IIs installed in New York, Australia, Tokyo and London, he said.

Several hundred users of personal computers and terminals, residing both on Ethernet and IBM Token-Ring local-area networks, often need to access "one type of system in the morning, a second in the afternoon and a third at night," Molloy added.

This can require the user to access three different terminals "so that you have to do huge changes when the user moves" to a different office location, Molloy said.

Molloy's group was looking for an integration tool that would "allow users to get at all systems from a single device and a standard interface, so when they move, all you have to do is find a free terminal server port," he said.

The group has installed on its networks Mitek Systems Corp.'s Openconnect Systems Server, which can act as both a LAN-to-host gateway and as a translator between Transmission Control Protocol/Internet Protocol (TCP/IP) environments and the IBM Advanced Peer-to-Peer Networking/Advanced Program-to-Program Communications (APPN/APPC) protocols used by AS/400s, Molloy said.

Servers now installed on LANs at Manufacturers Hanover can support the following connections:

- PC users and DEC hosts can communicate via TCP/IP.
- PC users can access AS/400 hosts via TCP/IP with the Mitek gateway translating the TCP/IP transmissions into APPN/APPC.
- DEC VT100 terminals can access AS/400s by emulating 5250 terminals, while 5250 terminal users can access DEC hosts via the TCP/IP Telnet protocol.

Insufficient references

The Manufacturers Hanover group evaluated a Forest Computer, Inc. gateway "that supported Decnet on one side and APPN on the other" but was unable to get sufficient user references, Molloy said.

In addition, the group was inclined to use TCP/IP as a common access protocol for user devices, partly because "a bunch of our areas want [reduced instruction set computing]-based machines and are clamoring for TCP/IP," Molloy said.

With some of its connectivity issues settled, the group now faces the question of how to provide network management across its IBM and DEC environments, Molloy said. Manufacturers Hanover's overall data center organization will be reviewing the possibility of a more centralized network management system — probably based on IBM's Netview — as a future phase of its consolidation effort, according to Senior Vice President Steve Sheinheit.

On a local level, however, the global banking group is primarily DEC-based, and its AS/400s cannot support Netview, Molloy said. The group is evaluating the possibility of using DEC's Decmcc Director management platform, with a Simple Network Management Protocol module to manage the group's Wellfleet Communications, Inc. and Vitalink Communications Corp. bridges, Molloy added.

FEATURE: NETWORK MANAGEMENT ISSUES

Using graphical interfaces to take a closer look

BY MICHAEL HURWICZ

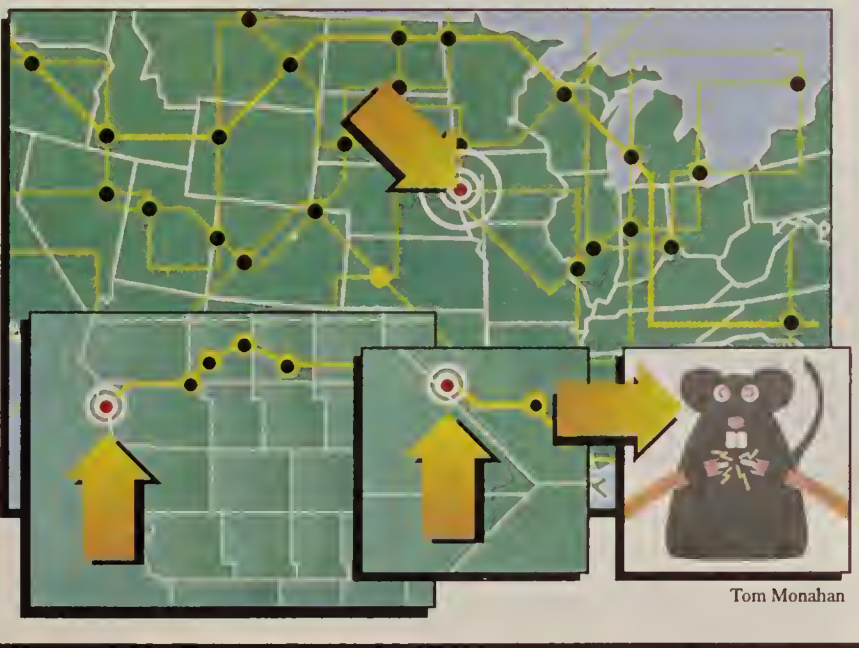
In a network control center, a picture is often worth more than a thousand words. Thousands of cryptic messages, representing the status of the many devices in a complex network, can be overwhelming and confusing when they are cascading across a screen.

In contrast, users say, network management software with a graphical user interface can show the broad outlines of a network problem at a glance, using icons and lines to represent network devices and links.

Such a clear overview of the network can be particularly helpful in the early stages of problem hunting, making it possible for network managers to react more quickly to glitches.

With a graphical interface, "we can look up and see summaries of the network, at whatever level we want to display, and tell immediately whether everything is operating correctly or if something demands attention," says Jim Montequin, senior manager of data communications at Union Pacific Railroad in Omaha.

While most users agree that graphics can play a useful role in network management, some companies nevertheless choose to focus attention on other issues, such as network management automation, which may lessen their need for graphical user interfaces.


Tom Monahan

State of the union

Graphical user interfaces are particularly valuable in monitoring large networks, says Ronald M. Tuccitto, senior manager of business planning at Union Pacific. Tuccitto oversees a network that includes 15,000 data devices on an IBM Systems Network Architecture (SNA) network, 600 microwave sites and 1,000 base radio sites spread across the U.S. IBM's Netview handles network management, with non-SNA devices using Netview/PC to communicate with the mainframe-based Netview system.

On large networks such as Union Pacific's, a character-

Continued on page 64

British Telecom Is

Dialcom®

British Telecom Is: Global Network Services℠, Network Management System, EDI✶Net®, Electronic Transaction Services, LAN Connectivity Services and much more.

Dialcom®, enhanced messaging services from British Telecom, is the most sophisticated, comprehensive package of business communication and information services available today. Dialcom® provides global coverage to every major industrial nation in the world. Just call our toll-free number for complete details.

Contact British Telecom: 2560 North First Street
P.O. Box 49019 ✦ San Jose, CA 95161-9019 ✦ 800-872-7654

British
TELECOM

Spirited.
Solid.
Strong.
Business Communications Around The World.

Graphical

FROM PAGE 63

based user interface can submerge staff in text, Tuccitto explains.

Such networks, Tuccitto notes, can generate thousands of "one liners," or alerts, each of which appears as a single line of text on a screen. "When you have that many alerts popping up on a console, there comes a point where you get buried in data," he says.

Union Pacific employs a huge projection screen that presents its wide-area network in living color. Graphic images on network management consoles point the staff in the right direction when they start investigating a problem, Tuccitto says.

Graphical user interfaces enable users to drill down for details. Union Pacific staff members can zoom in on a graphics screen to get a specific view of a particular portion of a state or regional network topology map. They also have the option of consulting textual alerts for the full details of any problem.

"We get a fast read on what's going on, rather than having to spend a lot of time analyzing what's going on," Montequin says. "With lines going past on a screen, it's much more complex. And when people are busy, they don't necessarily notice [that information]."

Color graphics can also make it easier to determine the severity and priority of a problem, Tuccitto explains.

For instance, if a T1 line goes down completely, that link may show up in red. Another color may be used to highlight the fact that the connection is present but unable to carry its rated traffic load. A severe but intermittent problem may appear as a line that flashes red. Such color coding helps managers prioritize problems.

Good relations

Graphical user interfaces can also make it easier to correlate multiple related alerts, says Kevin Huff, a Princeton, N.J.-based program manager for General Electric Co.'s international network and formerly head of a GE project concentrating on IBM's Netview/PC.

"We get multiple alerts that may be related to one specific failure," Huff says. "On T1 networks, for instance, if one T1 [line] goes down, you get multiple boxes reporting it."

This requires the network manager to correlate the alerts in order to determine the original source of the failure, because one failure affects many pieces of equipment.

> "THE [graphical user interface] . . . doesn't reduce interaction with the network management system."
>
> DOUGLAS UNDERHILL
> CSX CORP.

However, on a dynamic screen, where text-based alerts are rolling past quickly, it can be hard to do this, Huff says.

On the graphical screen, it is easier to see the pattern of T1 devices reporting the error and thus determine which alerts are grouped together.

The pattern of the failures may also make it easier to determine which device has the primary failure and which ones are failing because of a domino effect. "It's a much better way of doing network monitoring," Huff says.

Despite the attractions of graphical user interfaces, users should not overestimate their value, cautions Douglas Underhill, assistant vice president of technical services at the information systems subsidiary of CSX Corp., a Jacksonville, Fla.-based railway carrier. CSX has a network of approximately 20,000 workstations, terminals and printers at 500 locations scattered throughout the Eastern U.S.

"The [graphical user interface] makes network management information easier to understand," Underhill says, "but it doesn't do what you really want to do — reduce interaction with the network management system."

Long-Running Network Series.

Today's networking capabilities are making micros more powerful. So users are placing greater demands on their network's printers—for more speed, reliability and functionality.

That's where Genicom comes into the picture.

Our series of rock-solid serial matrix and line printers is designed to handle the demanding work loads and duty cycles of multiple users in shared resource environments. Day after day, week after week.

The Genicom 3800 is the premier network printer, with speeds up to 600 cps, dual paper paths and multiple emulations, all controllable from the workstation. Our 3410XL series of 400 cps printers features a number of high-performance models for specific applications. And for extremely high-volume users, we offer a broad range of shuttle matrix and band line printers—with speeds up to 2000 lines per minute.

Frankly, our printers are not cheap. But they're exceptionally cost-effective in the long run because they are rich in features, built to last and backed by a nationwide service organization. So no matter how many users are on your network or how many applications are being served, Genicom printers are designed to get the job done. And this makes them a hit on any network.

®GENICOM
Printers that work as hard as you do.

Genicom Drive, Waynesboro, Virginia 22980 Toll-free 1-800-4-GENICOM

LANDA℠ MEMBER

©1990 GENICOM CORP.

The danger with graphical user interfaces, Underhill says, is that because interaction is easier, users may become complacent and not search for more automated ways of handling network management. When network managers become too focused on the joys of graphics and mice, "there is a tendency simply to develop a two-finger approach instead of 10-finger approach to having humans supply commands," he says.

"The [graphical user interface] is a manual way users of network management systems can monitor the network," agrees Todd Dagres, director of communications research and consulting at The Yankee Group in Boston. "The next stage is where somebody doesn't have to sit there and look at [the] network and click down to the fault." For that, Dagres says, users need knowledge-based or artificial intelligence tools, which will make it possible for the system to correct faults automatically.

If that trend could be taken to its logical extreme, Dagres notes, a graphical user interface would not be necessary.

Keeping priorities straight

In fact, some network managers put a graphical user interface rather low on their list of concerns, according to Kevin O'Neill, vice president of network integration and consulting at Business Research Group in Newton, Mass.

"While users prefer a [graphical user interface] over a character interface if given a choice," O'Neill says, "most are grappling with more fundamental network integration and management issues such as performance tracking, report generation, security, rerouting capability and remote systems management."

Tuccitto: *Graphics needed for large networks*

O'Neill adds, however, that this may change as users conquer these basic issues and go on to address more advanced functions such as alarm correlation and integrated control.

View repair

Graphical network management software, while it saves time in interpreting and correlating alerts, can also mean extra work. For instance, Tuccitto says, Union Pacific has created customized views of its network, which require constant maintenance as the network changes.

Union Pacific is studying the feasibility of implementing a single database manager for all of its network support information. As part of this project, the company would like to be able to generate new customized views of the network automatically whenever the database changes.

Because of the work required to configure and maintain them, Dagres notes, graphical user interfaces will not necessarily reduce network management staff requirements, either in numbers of people or skill levels. And while graphical user interfaces make a graphic statement when problems occur, it is still necessary, in many cases, for network managers to consult a detailed textual report as well. "The [graphical user interface] is just the cherry on top of the sundae," Dagres says.

Despite difficulties in keeping views up to date and the danger of becoming overly infatuated with graphics, however, the basic fact remains: A picture is frequently the fastest, easiest way for the human mind to absorb and organize information. In resolving network problems, seconds often count.

As networks grow steadily larger and more complex, lessening some of the demands on network support staff is important. These facts combine to paint a rosy picture for network management graphical user interfaces.

Hurwicz is a free-lance writer and consultant based in Eastsound, Wash.

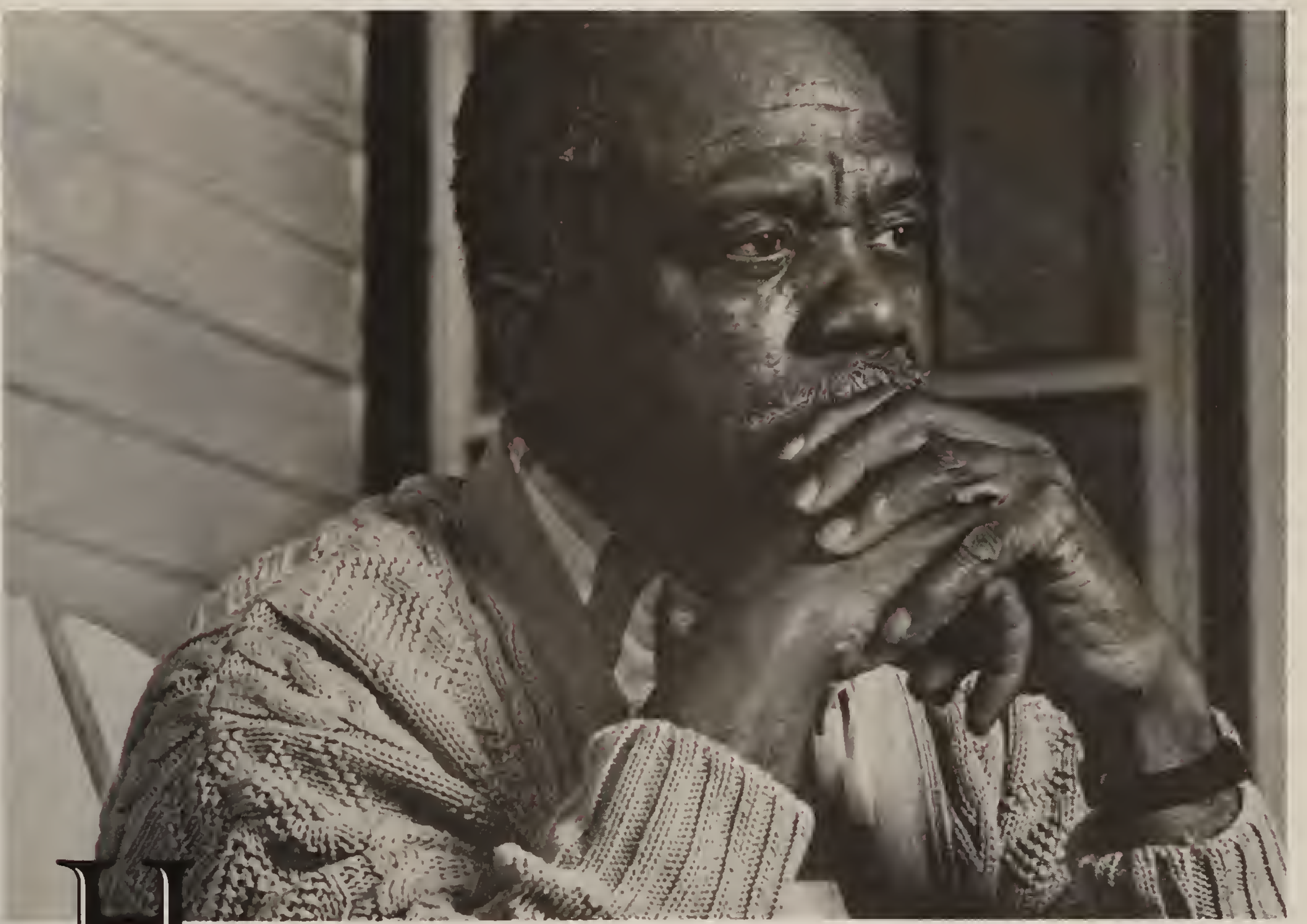
Flash and substance

Network managers rank the use of graphics, such as network topology maps and red light indicators, high on their list of priorities

Network management function Based on a 1989 survey of 128 network managers	Ranking 1=not important 5=very important
Immediate needs	
Fault detection/diagnosis	4.4
Problem management/reporting tools	4.3
Centralized network management	4.2
Graphics of network status	4.2
Second-tier requirements	
Performance statistics	4.1
Network security functions	3.7
Configuration management	3.6
Network design/capacity planning	3.6
Change management	3.5
Training	3.4
Network assets management	2.8
Call accounting/network cost allocation	2.6

Source: CSI, a division of 3Com Corp.

CW Chart: Paul Mock



He wants to do his taxes but he finds it too difficult to hold a pencil.

Without your company's help, he may not be able to do them.

For this man it's arthritis. For someone else it might be poor eyesight or maybe they just can't cope. The fact is, last year 4 million Americans got the help they needed from IRS Volunteer Assistance Programs.

If you have the desire to help and a basic aptitude for math, you could become a part of the IRS Volunteer Assistance Programs.

The programs are year-round and open to any company, organization or individual that would like to give something back to their community. The training is free and the rewards are enriching. So volunteer and call 1 800 424-1040. Beginning October 1, 1990, please call 1 800 829-1040.

Volunteer and help make someone's taxes less taxing.

A Public Service of This Publication & Ad Council Internal Revenue Service

Hubs become network's be-all, end-all

BY JOANIE M. WEXLER
CW STAFF

As the smart hub cabling craze continues, vendors are scrambling to compete by throwing everything but the kitchen sink into their products. Not only are users able to integrate various local-area networks under a common management system in the hubs — also called intelligent wiring centers — they can now get bridging, routing, network monitoring, terminal server and other functions in the devices as well.

Smart hubs allow users to connect nodes on a LAN or interconnect LANs running over different media in a physical star configuration. A cabling connection from the intelligent wiring center to each device allows foolproof detection of faulty nodes.

The topologies and access methods specified by the different LAN standards (such as token-ring's ring topology and token-passing access method) are handled logically within the hub.

Vendors such as Cabletron Systems, Inc., Racal-Interlan, Inc. and Synoptics Communications, Inc. have been showering the industry with enhancements to their products during the past several months.

Cabletron said it will announce today that it is shipping a $3,995 network monitoring module of Novell, Inc.'s Lantern product for Cabletron's Multi Media Access Center (MMAC). The move follows last month's rollout of a new version of the MMAC that integrates up to five Ethernet, Token-Ring and Fiber Distributed Data Interface (FDDI) modules and one management/repeater module.

Through thick and thin

The new MMAC version interconnects LANs running over unshielded and shielded twisted-pair, thin and thick coaxial cable and fiber. The MMAC also includes modules for Ethernet-to-Ethernet and Ethernet-to-FDDI bridging. A routing module is under development with Cisco Systems, Inc., according to Cabletron.

Racal-Interlan unveiled its Internext 5000 Communications System at Interop '90 in October. The hub integrates modules supporting 10Base-T concentrators, terminal servers and Simple Network Management Protocol (SNMP).

10Base-T is the recently approved — and flourishing — standard for running 10M bit/sec. Ethernet LANs over unshielded twisted pair. Other existing Ethernet standard media are coaxial and fiber-optic cabling.

Racal's terminal server module — which obviates the need to buy separate terminal servers — brings multiple nonintelligent terminals into the LAN environment, allowing them to connect to multiple hosts. Racal offers a module supporting both Local Area Transport — Digital Equipment Corp.'s widely installed proprietary network protocol for VAX terminals — and Transmission Control Protocol/Internet Protocol, another rampant communications protocol for Ethernets.

"Integrating the terminal server function into the hub will dramatically reduce the space required for our equipment," commented Marty Talarovich, senior research engineer at Kraft General Foods, Inc. in Glenview, Ill. Kraft started beta-testing Internext last week.

"The major cost savings will come in the maintenance area. Instead of having people screwing around with all different kinds of equipment, you'll have a single point of repair," he said.

However, Chris Oliver, Cabletron's director of engineering, estimated that users can save up to 30% on equipment costs alone by buying smart hub modules rather than separate devices, such as bridges, routers and terminal servers.

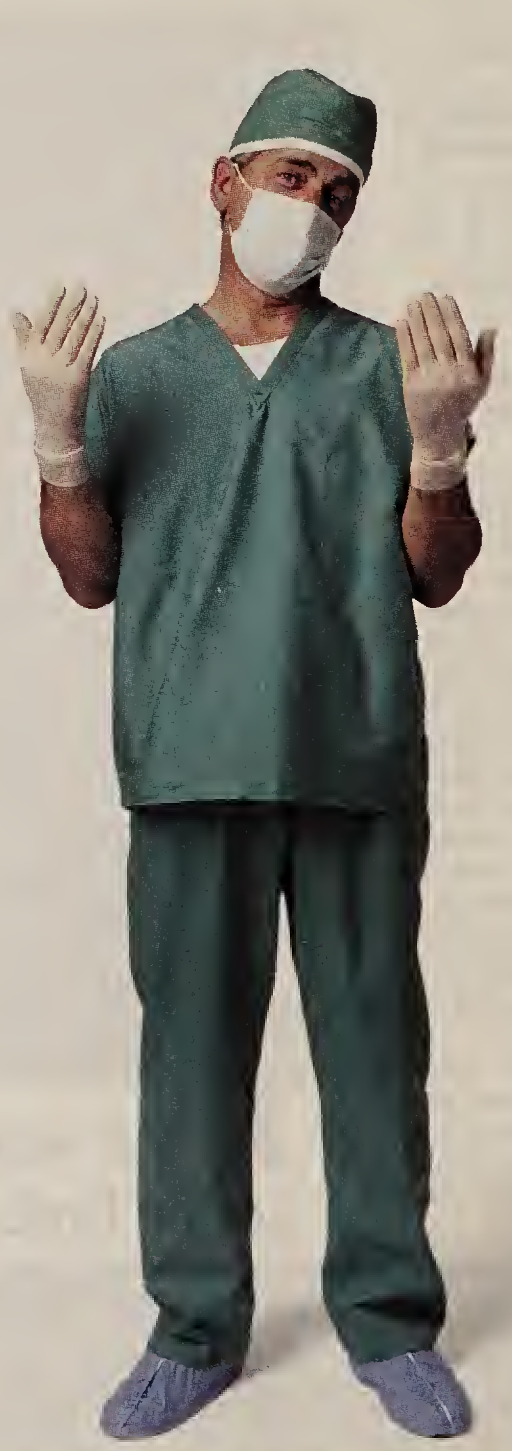
Synoptics announced in October a technology exchange with Xyplex, Inc. to incorporate Xyplex's terminal server into its Lattisnet System 3000 hub. A month earlier, the company integrated a multiprotocol local Ethernet router — developed in conjunction with Cisco — into the system.

The proliferating advances in wiring center technology will play an important role at Dallas-based Frito-Lay, Inc., which plans to expand its network from seven to 47 sites next year, according to Jack Sprague, a consulting engineer at the firm.

Sprague said recent wiring center advances will "keep us from having to train people at every location about all the different wiring nuances."

Other recent hub developments include Ungermann-Bass, Inc.'s recent announcement of intentions to integrate Advanced Computer Communications' multiprotocol bridge/router technology into the Ungermann-Bass Access/One hub. In addition, Lannet Data Communications released its Multinet II Super Hub in October. The product accommodates up to 18 Token-Ring, four Ethernet and one FDDI LAN and integrates bridge, routing and gateway functions.

David Systems, Inc. has announced that SNMP support will be available in its Expressnet hub in January, and Proteon, Inc. has added 4M and 16M bit/sec. fiber LAN support to its Series 70 hub Intelligent Wiring Center.



Would you prefer a real heart surgeon?

It's the same with networking.

Networking.

Your life may not be at stake when you choose a networking resource. But the health of your business could be. That's why you need a real expert.

ComputerLand.®

We've designed and installed twice as many single and multivendor networks as our nearest competitor. Over 35,000 according to the 1989 *LAN Magazine* Annual VAR Survey.

And for good reason.

You see, ComputerLand carries products from all the top players in networking, including IBM,® Compaq, Apple,® Novell,® 3Com® and Microsoft.®

We're staffed with hundreds of networking engineers. All ComputerLand-certified. Plus

© 1990 ComputerLand Corporation. IBM, Compaq, Apple, Novell, 3Com and Microsoft are registered trademarks of their respective companies.

Technologies for linking LANs to T1 networks emerge in products

BY CARL MALAMUD
SPECIAL TO CW

Fast packet, frame relay and cell relay: You've heard of them in relation to linking local-area networks across a T1 circuit (see story page 77). Now that the technologies are starting to show up in the form of real and announced products, you may be wondering which capabilities to choose for your LAN interconnection scheme.

The decision depends on the amount, type and speed of traffic crossing the T1 channel, as well as the distance being covered. In some cases, you won't need any of these new options.

Such would be the case when a network manager wants to integrate several different work groups into a single, logical network. Most bridges and routers now support 1.5M bit/sec. T1 links, which should provide sufficient bandwidth for two 10M bit/sec. LANs regularly exchanging data within a metropolitan area. Some LAN interconnectivity devices even support multiple T1 links for those users who want to interconnect multiple LANs or LANs with particularly high-volume traffic. The routing function inside of the device decides which line to use for any given packet.

Cisco Systems, Inc.'s AGS+ router supports more than 20 T1 lines. The lines can go to 20 different locations, or multiple lines can go to one location, providing increased bandwidth and some protection against line failures.

Dedicated T1 lines are not always economically feasible, however, and traffic does not always travel in a steady stream, especially between LANs. With T1 lines costing several dollars per mile per month in a national network, it makes economic sense to allocate the T1 bandwidth among several different applications, including LAN interconnection, voice and video.

One way to do this is through a T1 multiplexer, which serves as an entry point to the T1 network for both LAN interconnectivity devices and other customer premises equipment such as private branch exchanges. The multiplexer allocates subchannels within the T1 link to LANs, voice, video and other applications through circuit-switching technology.

While circuit switching is an inexpensive technique, it also requires dedicated bandwidth allocation, which can be inefficient if the traffic on each circuit is not continuous. The technologies that are starting to address more flexible bandwidth allocation are frame relay and its counterpart, cell relay. The CCITT standard-based version of cell-relay technology is called Asynchronous Transfer Mode. Frame relay and cell relay are both fast-packet technologies.

Frame relay is both an interface and a transport service that handles packets of variable length. By contrast, cell relay interfaces and transports packets of fixed length. Frame- and cell-relay interfaces and transport services can be mixed and matched. For example, Stratacom's $12,500 packet assembler/disassembler (PAD) for its IPX T1 multiplexer uses frame relay on the application side of its interface and a proprietary cell-relay technique on the wide-area network side.

When both nodal processors — on the sending and receiving end — support packet-switching technologies, such as frame and cell relay, they can dynamically allocate bandwidth for applications as needed instead of fixing a maximum for each one. For instance, if data and voice share a T1 pipe, the nodal processor can squeeze a little more data into the gaps between words, giving more rapid throughput for the data application.

Rush-hour traffic

Frame relay parallels X.25 packet switching in that it allows a LAN interconnection device to tell a nodal processor it wishes to set up a virtual circuit in the private network. It is also specifically designed to handle traffic sent in bursts. It is faster than traditional packet-switching in that it eliminates error-detection and correction on each network link, as does cell relay. Error-checking at only the origin and destination nodes is made possible by today's highly reliable communications media, such as fiber-optic cabling.

Frame-relay products are just starting to hit the market. Cisco and Stratacom are shipping products, and Codex Corp., which has a 20% investment in Stratacom and resells the IPX as its 6290 T1 multiplexer, said it will also support frame relay on its 6525 X.25 packet switch and 6507 PAD in first-quarter 1991.

While frame relay has shown up only in equipment for private networks, it can be used as an interconnection to a public data network. In this case, the user needs to purchase only the bridge, router or gateway that supports frame relay and let the carrier provide the nodal processors and transport service. U.S. Sprint Communications Co. has announced frame-relay service for late 1991, and Northern Telecom, Inc. has announced equipment that will allow other carriers to offer public frame-relay-based services in the future.

Senior writer Joanie M. Wexler contributed to this report.

Malamud writes professional reference books about computer networks.

Or someone who's still playing doctor?

extensively trained by every one of these top manufacturers.

That's why we know exactly which networking products can and can't work for you.

Whether they adhere to industry standards. And whether they have the functionality and compatibility to make your investment in networking really pay off.

What's more, when it comes to building a network around equipment you've already got in place, nobody's more experienced than ComputerLand.

ComputerLand
Business to business. Person to person.

So, don't waste your time and money on someone who's still playing around.

Call 1-800-852-8043 extension 35 to find the ComputerLand nearest you.

You'll be putting your company in the hands of the real experts.

NEW PRODUCTS

Micro-to-micro

Information Presentation Technologies, Inc. (IPT) has announced the implementation of a version of its Ushare interoperating system connectivity software package onto IBM RISC System/6000 Power Server computers.

Ushare comprises programs that reside on a Unix platform and enable the product to act as an Apple Computer, Inc. Appleshare-compatible server. It enables the RS/6000 to provide Apple Macintosh machines and IBM Personal Computers with a gateway to IBM mainframes, according to the vendor.

Ushare is priced at $1,195 for a file server only and $3,995 for the server equipped with all its modules.

IPT
305 San Vincente Blvd.
Santa Monica, Calif. 90402
(213) 393-6281

Dataviz, Inc. has announced Version 4.5 of Maclinkplus/PC and Maclinkplus/Translators, both of which enable users to translate text files with embedded graphics for word processors.

The software package includes all necessary software and cabling for bidirectional file transfers and conversions between Apple Computer, Inc.'s Macintosh, DOS, Sun Microsystems, Inc. or Next, Inc. Next environments.

Maclinkplus/PC version costs $199; Maclinkplus/Translators sells for $169.

Dataviz
35 Corporate Drive
Trumbull, Conn. 06611
(203) 268-0030

Links

Adtech Micro Systems, Inc. has introduced Perfect Fax Plus, a facsimile card designed for automatic fax, voice or data switching.

The 9.6K bit/sec. CCITT Group III device can share a single telephone line with a telephone, answering machine or modem. An automatic group creation feature enables users to create databases of frequently called numbers can be used with Intel Corp. 80386- or I486-based XTs, ATs or compatibles. A built-in text editor allows fax text to be created and edited.

It is priced at $295.

Adtech Micro Systems
43120 Christy St.
Fremont, Calif. 94538
(415) 659-0756

Intellicom, Inc. has added a line-powered version to its Long Link family of parallel interface extenders.

The Long Link III is available in three models: the LLLP-50, the LLLP-100 and the LLLP-300. According to the vendor, the products enable personal computers to communicate with a printer from distances of 50, 100 and 1,000 feet, respectively.

Prices range from $149 to $179, depending on model.

Intellicom
20415 Nordhoff St.
Chatsworth, Calif. 91311
(818) 407-3900

Gateways, bridges, routers

Halley Systems, Inc. has introduced a family of source routing bridges designed for token-ring networks.

The Connectlan 300 Token-Ring Bridge series of products includes the Connectlan 300, which can be switched between 16M and 4M bit/sec. token-ring networks. Other members of the series include the Connectlan 302 local bridge, the Connectlan 311 single-link remote bridge, the Connectlan 321 dual-link remote bridge and the Connectlan 331 triple-link remote bridge.

Pricing ranges from $6,995 to $11,500, depending on configuration.

Halley Systems
2730 Orchard Pkwy.
San Jose, Calif. 95134
(408) 432-2600

Fairchild Data Corp. has announced an Ethernet-to-broadband bridge designed to be a link between local-area networks.

The LBR8323 can extend individual LAN connections by up to three miles by dividing the LAN into independent sections, parts or subnetworks. It also reportedly lets users isolate faults and reduce network traffic, delays or collisions.

The bridge uses 32-bit processing to provide a forwarding speed of 14,000 packet/sec. and a 25,000 packet/sec. filtering speed.

It is priced from $6,995.

Fairchild Data
350 N. Hayden Road
Scottsdale, Ariz. 85257
(602) 949-1155

Simware, Inc. has announced an enhanced version of Simac, its presentation and connectivity software package designed for Apple Computer, Inc. Macintoshes.

Simac 3.1 provides Macintosh users with a Macintosh interface while also performing the 3270 emulation tasks needed to access IBM mainframe applications.

The product costs $395.

Simware
20 Colonnade Road
Ottawa, Ont. K2E 7M6
(613) 727-1779

Now you can escape the confines of your system and never get caught.

When an organization runs off in every direction, it's hard for its systems to keep up–especially since IBM channels can't reach beyond a few hundred feet.

Network Systems' channel extension family overcomes the physical limits of IBM channels. It helps you arrange systems according to business needs, not technical specs. So you can make channel connections to all kinds of peripherals, computers, and networks almost anywhere with no performance loss.

Our channel extension family is big enough to let you start at any level and grow from there. And its design is open-ended, so you won't get trapped by old technology in the future.

Unleash the full potential of your systems. Call us at 1-800-338-0122. Network Systems.

©1990 Network Systems Corporation

MANAGER'S JOURNAL

EXECUTIVE TRACK

Ronald C. Eubank has been named director of information technology in the Global Technology and Operations Division at **Whirlpool Corp.** in Benton Harbor, Mich.

Eubank was formerly manager of information technology planning for the company. In his new position, he reports to Senior Vice President Lawrence J. Kremer.

He joined Whirlpool in 1973 as a systems analyst and progressed through a series of positions in the information technology area. He holds a bachelor's degree in business from Indiana University at Bloomington and a master's degree in business from Indiana University at South Bend. He is a certified information systems auditor.

....

Richard L. Wambold has been given responsibility for corporate information services functions at **J I Case,** the Racine, Wis.-based agricultural and construction equipment subsidiary of Tenneco, Inc.

Wambold, 38, added corporate IS and corporate planning and development to his duties when recently promoted to executive vice president from senior vice president. He remained general manager of Case's international business group.

Wambold previously held positions in corporate systems at Houston-based Tenneco.

....

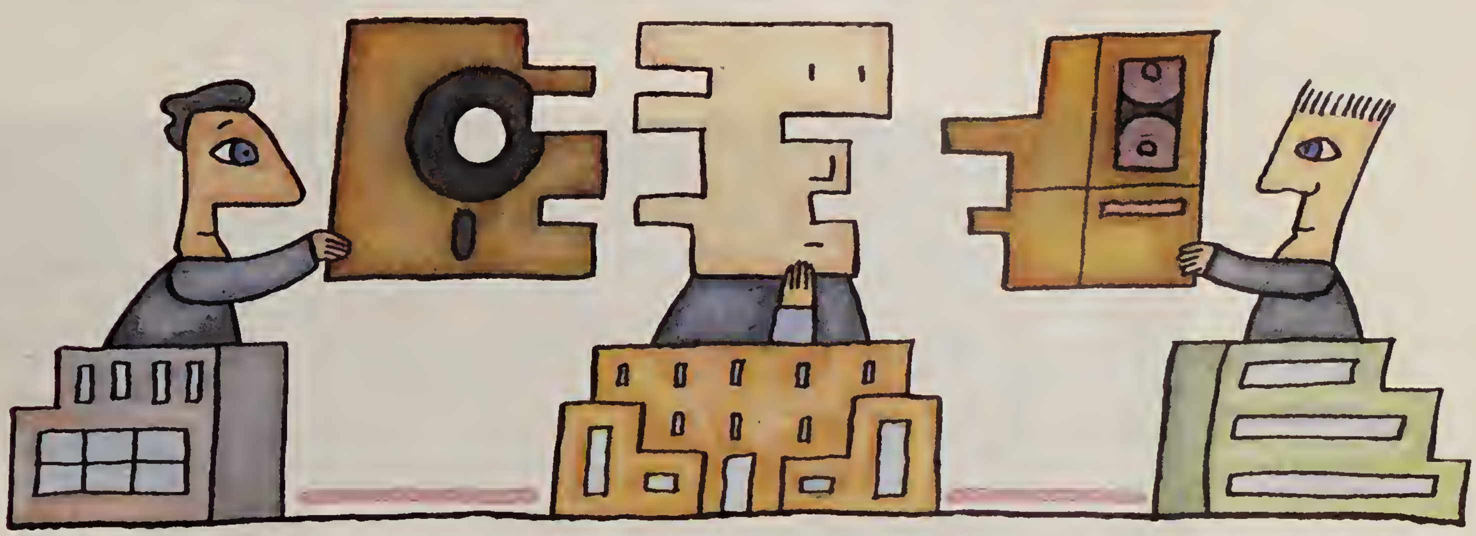
Donald L. Morchower, executive vice president and chief information officer at **Empire Blue Cross and Blue Shield** in New York, has been promoted to executive vice president and chief operating officer.

Morchower is now responsible for customer service and sales as well as IS.

Morchower joined Empire Blue Cross as CIO in 1987 after 25 years at Deloitte Haskins & Sells, which is now Deloitte & Touche. His positions included partner in charge of information technology and partner in charge of the New Jersey Consulting Division.

Soul-searching: four case studies

Choices of integrators, outsourcers or in-house talent contain some common threads



Richard A. Goldberg

BY JOHANNA AMBROSIO
CW STAFF

Some companies will, some will not, and some are thinking about doing it more frequently. But whatever a company's philosophy is toward using systems integrators for important information systems projects, most of those that have reached a decision have gone through a similar process of soul-searching. And there are some common threads in the quest for answers.

The steps that most firms go through can be broken down into two major categories. First is determining what the company's core business is and how critical technology is to that business. Second is figuring out what specific technology and expertise are needed to support that business, what exists in-house and what should be brought in from outside — if anything.

A look at four firms illustrates how they went about deciding whether to use systems integrators or outsourcers and for what. Diesel Technology Corp., a manufacturer in Grand Rapids, Mich., outsourced its entire IS function, while Canada Post Corp., the privately owned Canadian mail delivery service in Ottawa, opted to outsource major portions but not the whole thing.

Taking a different approach was New York-based Shearson Lehman Brothers, Inc., which decided not to use outsiders for much. Somewhere in the middle is Goldman Sachs & Co., also in New York, which has used systems integrators in the past for specific projects and likely will again.

• **Diesel Technology.** The firm's technology decision odyssey began when Derek Kaufman became president in November 1988. The firm had previously been a division of General Motors Corp., with headquarters in Rochester, N.Y., and the manufacturing plant in Grand Rapids. Diesel Technology's entire computing resource was a time-shared mainframe in Rochester.

"Our DP system cost over 3% of revenues, and we couldn't afford it," Kaufman recalls. So as part of his overall strategic revamping of the firm, Kaufman and his management team began to figure out how they wanted Diesel Technology to operate. They began an item-by-item analysis of what the company should be doing and what it should bring in from outside, including everything from components in the manufacturing process to computers.

"We make only certain things here," he says, "and we buy other things, like springs and O-rings, from outside suppliers because it doesn't make sense for us to do them. It lets us add value to what we do because we concentrate on our main business."

Similarly, Kaufman says, "We don't do systems integration very well either." Still, the decision to outsource "did not come easily. Our first inclination was to do everything ourselves. My internal MIS guy started talking about building an empire of people and machines. And you have to consider that you're paying $300 per person a

Continued on page 73

Computerworld honors cream of the crop

John Martini

The 10 most effective users of information technology in 1990, as ranked by the *Computerworld Premier 100*, were honored last week in New York. Information systems executives accepting awards were: (front row, from left) Carmine Vona, Bankers Trust New York Corp.; Allen Ditchfield, MCI Communications Corp.; Ron Cybyske, Banc One Corp.; Thomas Kiernan, AMR Corp.; Linda George, Gencorp; and Anish Mathai, Bankers Trust.

(Back row, from left) *Computerworld* Publisher Fritz Landmann; *Computerworld* Editor in Chief Bill Laberis; Robert McKinney, Paine Webber, Inc.; International Data Group Chairman Patrick McGovern; Brian Phillips, Norwest Corp.; and keynote speaker Peter Keen.

Other firms in the top 10 were FMC Corp., Union Texas Petroleum Holdings, Inc. and General Dynamics Corp.

Leo Burnett
Is Sold On All Of

©1990 Novell Inc.

ADVERTISING THESE NETWORKS.

Leo Burnett Advertising knows the value of selecting top-rated network programming for its clients. And for its computers.

So when Burnett's information services group decided on a PC-based network, they chose NetWare,® the only network operating system that's in its eighth generation. According to Bill Engelbrecht, executive vice president of administration, "The network we installed must take us beyond the year 2000. That's why we chose to align ourselves with the leader in networking."

Needless to say, long-term relationships are nothing new to Burnett. After all, Burnett has retained some of this country's premier advertisers for decades, growing into one of America's largest advertising agencies with billings exceeding $3.2 billion.

"One of our strategic goals is global connectivity between the 49 offices we maintain around the world, and the ability to further improve communication with our clients," recalls Engelbrecht. "With NetWare, many of our clients have access to information on our network, giving us a competitive edge in account service."

Burnett's network, which was installed in just three days, spans 29 floors to link 1,200 personal computers, integrate an IBM mainframe and provide remote connectivity. In fact, its advanced capabilities earned Burnett the Excellence Award from the Enterprise Networking Institute.

But beyond exceptional functionality and the industry's tightest security, NetWare offers something other solutions simply can't — compatibility with more applications, computing environments and hardware than any other network operating system.

So call 1-800-LANKIND for your NetWare Buyer's Guide. And learn how NetWare is helping make Leo Burnett a commercial success.

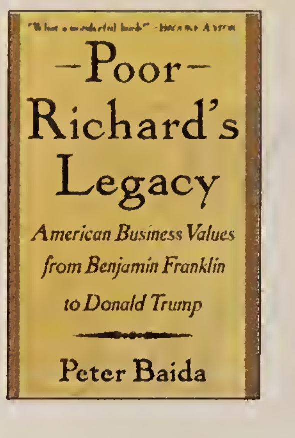
NOVELL

The Past, Present, and Future
of Network Computing.

BOOK REVIEW

Looking back on more than 200 years of American business

POOR RICHARD'S LEGACY: AMERICAN BUSINESS VALUES FROM BENJAMIN FRANKLIN TO DONALD TRUMP
By Peter Baida
William Morrow and Co., $22.95


-Poor-
Richard's
Legacy
American Business Values from Benjamin Franklin to Donald Trump
Peter Baida

Given the choice between "a 250-year stroll through business history" and a trip to the dentist, many of us might opt for a nice shot of Novocain and call it a draw.

So Peter Baida was certainly tackling a formidable topic when he ventured forth with his book *Poor Richard's Legacy: American Business Values from Benjamin Franklin to Donald Trump.*

Baida reaches back through more than two centuries of American business morality and practices, spiking the story with well-researched biographies of such major players as Benjamin Franklin and IBM's Thomas Watson. Baida also highlights the popular business literature of the past, noting how business was a powerful magnet for the prose of muckraking journalists.

The author is a graduate of Harvard University and has an MBA from the University of Pennsylvania's Wharton Business School. He has written on business for *The Wall Street Journal, The New York Times, The Atlantic, Harvard Business Review* and other publications. Baida plies his expertise throughout *Poor Richard's* 341 pages, displaying a wealth of detail and sprinkling the text with anecdotes.

Still, the book has a tendency to stagger under its own weight, reading more like a well-written college textbook than a would-be business best-seller. Surely Baida's call for a return to the "basic values of savings, hard work and keeping an eye on the future" will startle no one with its novelty.

By far the most interesting bits in the book are the stories about famous — and infamous — business moguls such as John D. Rockefeller, Andrew Carnegie, Cornelius Vanderbilt and Henry Ford.

Rockefeller, we learn, was busy keeping score while other little boys played ball. The founder of the Standard Oil Co. grew up with "the soul of a bookkeeper" and a tendency to lecture himself sternly as an antidote to overconfidence.

Henry Ford gets the sternest treatment in the book as Baida describes how the auto magnate destroyed his son and allowed the management of his automobile company to deteriorate. "Nowhere in the history of American business are the dangers of one-man rule more frighteningly demonstrated than in the decline of the Ford Motor Co. in the last 30 years of Henry Ford's life," Baida notes.

While the author presents a meticulously detailed case on the decline of American business values — contrasting it with the rise of corporate and consumer debt — he gets a trifle whiny at times with chapter subheadings such as "Whatever Happened to Yankee Know-How?" or "Whatever Happened to Thrift?"

Naturally, his tale begins and ends with that legendary tower of thrift and Yankee know-how, Benjamin Franklin, whom Baida sketches in the glowing terms of an unabashed admirer.

The author is a big fan of IBM as well. The chapter on "The Triumph of IBM" is glowing to the point at which it seems to embarrass even Baida, who spreads a thick coating of glossy company history over the narrative. He gets positively giddy about IBM's humble beginnings as "an unlikely conglomeration of companies that made meat slicers, butcher scales, coffee grinders, time clocks and primitive tabulating machines."

"Reading about IBM, even a doubting Thomas may begin to feel a sneaking fondness for it," he writes, admitting to a certain "uneasiness" because "everyone associated with IBM seems to say the same wonderful things and to have the same wonderful attitudes."

Oh, spare us.

Then again, perhaps a business historian cannot help but wax poetic about a company that in less than 80 years "became one of the world's most profitable industrial enterprises."

Baida finds little to admire in 20th-century business culture. He dismisses the "shamelessly cynical" business books of the 1970s, such as Robert Ringer's *Looking Out for Number One,* and bemoans the way the "success literature" of the last few decades veered away from the thrift, discipline and hard work embodied by Benjamin Franklin's philosophies.

The bottom line of *Poor Richard's Legacy* is rather like The Historian's Lament with a business twist: We should be learning from the past with the firm intention of repeating it.

"Perhaps we have lost not merely the capacity to work and to save but also the capacity to listen," Baida writes. Americans, he insists, have lost "not merely the discipline to deny ourselves for the future, but also the discipline to learn from past."

MARYFRAN JOHNSON

Johnson is a *Computerworld* senior editor, systems and software.

Not all wiring products are designed with tomorrow's growing needs in mind.

AT&T premises wiring system components offer the flexibility for your multi-functional needs.

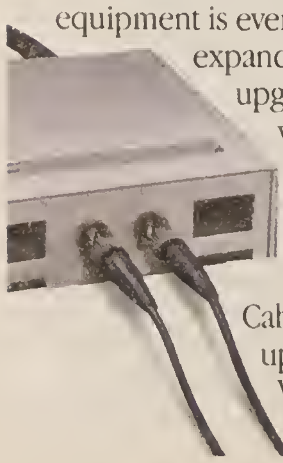
The world of communications equipment is ever changing. Always expanding. Being upgraded. Will your wiring systems keep up? Or will the equipment start closing in? AT&T's Composite Cable will keep it all up and running. With fiber and copper under one jacket, it allows you to transmit both voice and data over copper and, looking to the future, handle high-performance, wide-bandwidth FDDI transmission over fiber.

The AT&T Multi-Media Outlet and ST® II Connector are compatible with the cable. And all three components are part of the AT&T SYSTIMAX™ Premises Distribution System offering, which supports FDDI and open system architecture.

As always, you're assured that every AT&T wiring system component is backed by the technology and expertise of AT&T Bell Laboratories.

So for wiring systems that will keep up with your growing needs, call AT&T Network Systems at 1 800 344-0223, ext. 5230.

AT&T
Network Systems



Repetitive Motion Institute opens, first in U.S.

BY J. A. SAVAGE
CW STAFF

SAN JOSE, Calif. — Calling repetitive motion illness the "occupational epidemic of the '90s," Santa Clara County last month established what is believed to be the first Repetitive Motion Institute in the U.S.

"The number of those suffering from repetitive motion injury is increasing. Most of that increase is coming from information processing workers," said Linda Morse, medical director at the Institute.

Repetitive motion illness usually manifests itself in carpal tunnel syndrome, tendinitis and ulnar nerve compression. Morse said the clinic is not just administering to workers who suffer from repetitive motion illness, but is working "with companies and unions to prevent injuries."

When a firm or its insurance company calls the institute, it will respond by first taking a survey of workers, according to Tami Carver, project director at the institute. The survey will find out if workers are experiencing neck or wrist pain as well as find out if hobbies or nonwork-related activities may be contributing to such problems.

The institute will then offer education. Institute representatives will also share their supply of various ergonomic products, or what they like to call "quick fixes." These include wrist rests for use with a keyboard, phone headsets to relieve the hands from the strain of holding a receiver and footstools and pillows to improve posture.

"The real answer is fully adjustable chairs and work surfaces," Morse said. "But most companies can't afford it all at once."

Other than physical changes, altering work habits can also help. "We try to get management to rotate work tasks such as clerical and word processing," Morse said. "There is also the issue of work breaks."

She said she thinks a few minutes of break and exercise every half hour to hour is important. "The body just wasn't created to type 20,000 strokes an hour."

During the last five years, the Santa Clara Valley Medical Center, which hosts the institute, has treated repetitive motion illness as part of its occupational health clinic. Santa Clara County decided to fund an institute "to create a focus that this is a major problem," Morse said.

Not what the doctor ordered

The following is a list of common ergonomic problems for office workers, according to the Santa Clara Valley Medical Center Repetitive Motion Institute:

- Standing in one place.
- Sitting erect without a back support.
- Desk too high or too low for task.
- Seat too high or too low.
- Trunk curved forward when sitting.
- Head held forward.
- Frequent bending or twisting of body.
- Wrists bent when working on keyboard.
- Pressure on fingertips.
- "Winging" elbows.
- Improper lighting.

Soul-searching

CONTINUED FROM PAGE 69

month for benefits coverage."

Kaufman said he was convinced by Electronic Data Systems Corp. (EDS) that outsourcing was the way to go. In a seven-month period, using EDS as its sole source, Diesel Technology got off the time-shared mainframe, brought in computers for all aspects of the company and "cut our DP costs in half," Kaufman says.

"They convinced me they could get small, get fast and get cheap," he says.

• **Shearson Lehman Brothers.** On the other end of the spectrum, David Sherr, vice president of distributed infrastructure support at Shearson, expresses complete confidence in Shearson's staff to handle IS operations and systems integration themselves. "Under very special circumstances, if the business need is acute, we would consider [outside integration firms]," he says. "But we have a lot of experience in-house, and we generally handle any integration projects."

Sherr's 1-year-old group, made up of 13 people, "has demonstrated we have the skill and the ability to do it." So there is little need to go outside for help, he says. And the one time he did try an ambitious project with outsiders, "it did not go well," he says.

Another factor at Shearson is the company's homegrown layer of software to connect applications to databases, communications and computer gear. It allows Shearson flexibility in changing vendors for different computing components.

That layer of software "is our competitive advantage. So we're very careful about who gets to see it," Sherr says.

• **Goldman Sachs.** Shearson rival Goldman Sachs approaches the subject with a very different perspective. "We've used integrators to help with specific projects, and I'd do it again," says James K. Burns, vice president of IS management. When the company converted from Burroughs Corp. to IBM mainframes one year ago, he used Andersen Consulting and Computer Associates International, Inc.

Then again, Burns has a more personal history with systems integrators than do many of his IS colleagues. He used to work for Andersen Consulting, which gives him more exposure to the subject. "I know how to work with these guys, how to prequalify them so they know our company and what we need," he says.

Burns thinks of using systems integrators as a way to temporarily expand his resource pool. Otherwise, he says, "you either have too many people on your payroll or you don't satisfy demand because you have too few.

"My job is to do what's best for the company," he says. "Sometimes that means using internal people, sometimes external." In most cases the external people have a supplemental role to the internal IS staffers, he says.

> "I KNOW HOW TO work with these guys . . . so they know our company and what we need."
>
> JAMES K. BURNS
> GOLDMAN SACHS

• **Canada Post.** The Canadian postal service took a more radical tack to using outsiders. "We've had to redefine how we deliver systems to the corporation," says James T. Baines, corporate manager of purchasing. "We currently have a mishmash of systems that never did, and never will, suit our business needs."

So the goal is to help people implement systems that will better fit the business requirements. But "MIS guys and end users may not know there are better ways to do something. We had to improve that process," Baines says.

Now, end users bring their requests to a member of the company's information technology group, who figures out what specific business skills a project requires. The group then decides which systems integration vendor is best suited for that project and brings in that company.

The systems integrator spends time with the end users and information technology people, and together, all three groups derive a functional specification for the system. The outside firm then defines specific deliverables of the project and Canada Post sends out bids, evaluates them and awards the project.

Canada Post used this technique when it built a state-of-the-art mail processing center, working with such integrators as EDS and Andersen Consulting. And the firm will use more of the technique in the future.

"We're looking for companies that will be the integrators of record for large areas of our company; to own a piece of our business," Baines says. "We want to outsource our infrastructure. We'll provide the architecture, set the standards and tell them what we want, and they'll do it. We're passing the responsibility to them but also the risk."

The decisions faced by all four firms clearly go much deeper than the technology needs of any one project. To an increasing extent, going outside or staying in-house will say a lot about a company's business strategy and corporate culture. The elusive "what's best for the company," even between firms in the same industry, can — and will — vary widely among the fellow soul-searchers in IS.

MANAGEMENT BRIEFS

OASI issues call for papers

The Office Automation Society International (OASI) has issued a call for papers for its eighth annual conference to be held June 17-19 in Alexandria, Va.

The theme of the conference is converging technologies. Papers are encouraged in the areas of management in automated environments, applications, new or emerging technologies and problem identification and solutions.

Those interested must submit an abstract of the paper by Dec. 30. Completed papers are due Feb. 15, 1991. To make a submission or to request more information, contact: OASI, P.O. Box 374, McLean, Va. 22101, (703) 821-6650.

The OASI is a nonprofit association dedicated to providing education and professional certification in office automation systems and management.

AT&T
Premises
Wiring System
Components

Here is a brief description of some of the AT&T components that can help you design the best wiring system to serve you now and in the future. For more information, send in the coupon below, or call 1-800-344-0223, ext. 5230.

Composite Cable
1090/2090, 1290/2290

AT&T's Composite Cable is constructed with two 4-pair 24 gauge copper inside wiring cables combined with two 62.5/125 micron fiber cables. In combination with AT&T baluns and adapters, this cable provides the means to serve multi-vendor data systems for distances that meet or exceed those normally encountered from workstation to closet.

Multi-Media Outlet

AT&T's Multi-Media Outlet terminates the cable at the workstation and is easily assembled into a compact telephone and data information outlet. The outlet accepts standard copper and fiber connector parts (including FDDI) and is ideal for baseboard, raceway or wall installations.

ST® II Connector

The AT&T ST II Multimode Lightguide Connector is specifically designed for distribution applications and for use in cable-to-cable or cable-to-equipment multimode individual fiber connections. In addition, it is easy to terminate, having only a single crimp sleeve.

AT&T
Network Systems

COMP1203
AT&T Network Systems
505 North 51st Avenue
Phoenix, Arizona 85043
Attn: National Telemarketing Center

Yes, I'd like to know more about AT&T Premises Wiring System Components.

Name ____________
Company ____________
Title/Position ____________
Address ____________
City ____________
State ________ Zip ________
Phone ____________

Goal Systems' product line for the VSE environment ...

Automated Systems Operations

FAQS/ASO for VSE
FAQS/ASO for VM

Production Control and Job Scheduling

FAQS/PCS

Productivity Tools

FLEE

Tape/Disk Management

EPIC/VSE
EPIC/CMS

VSAM Management

MASTERCAT
FAVER
VSAMAID
HYPER-BUF
EXTEND/DASD

Resource Optimization

EXPLORE for CICS
EXPLORE for VSE
EXPLORE for VM
EXTEND/VSE
APAS Solution

Systems Assurance

ALERT for CICS
ALERT for VSE
ALERT for VM

IBM Business Partner

THE ULTIMATE GOAL IS NOW

Systems management ... You've told us you're serious about automating, but your products aren't. You've said you spend too much time managing product interrelationships– because integration isn't real. You've told us you need one vendor who will give you systems solutions, and stand behind them–now and in the future.

Goal Systems has heard you. And we're *very* serious.

We've assembled the most powerful systems management product line. Forward-looking, industry-renowned products–with the depth of function you've been asking for.

We're pulling them all together to complete our enterprise integration strategy, and give you *real* value. Keeping an eye to the future and an unwavering commitment to quality.

The ultimate goal is now. From one vendor. To reach your ultimate goal, call **(800) 829-9002**. Just imagine where we can take you from here.

Goal Systems

... And for the MVS environment ...

Automated Systems Operations

OPS/MVS
FAQS/ASO for VM

Production Control and Job Scheduling

JOBTRAC

Report Distribution and Delivery

SAR
Express Delivery

Productivity Tools

FAQS for MVS
PDSMAN

Tape/Disk Management

EPIC/MVS
EPIC/CMS

VSAM Management

MASTERCAT
FAVER
VSAMAID
HYPER-BUF
EXTEND/DASD

Resource Optimization

CICS/Express
Insight for DB2™
Explore for MVS
Explore for CICS
Explore for VM
APAS-PLUS

Systems Assurance

ARISE II
ALERT for VM

DB2 is a registered trademark of IBM Corporation.
Photos courtesy of NASA and Richland College, Dallas, Texas

CALENDAR

Users of Sun Microsystems, Inc. workstations will gather at the Sun Open Systems Expo in Boston, Feb. 25-27.

The event will feature a series of tutorials under three different technical topics: the Scalable Processor Architecture, networking and windowing/graphics. There will also be exhibits by Sun and related peripheral and software vendors.

For more information, contact Sun Open Systems Expo in Austin, Texas at (512) 331-7761.

JAN. 6 - 12

Macworld International Summit. San Francisco, Jan. 7-8 — Contact: Susan Carroll, Macworld Communications, Inc., San Francisco, Calif. (415) 978-3392.

International Security Conference and Exposition West '91. Anaheim, Calif., Jan. 9-11 — Contact: Cahners Exposition Group, Des Plaines, Ill. (708) 299-9311.

JAN. 13 - 19

ICA Winter Seminar. Houston, Jan. 13-16 — Contact: International Communications Association, Dallas, Texas (214) 233-3889.

Pacific Telecommunications Conference: Accessing the Global Network. Honolulu, Jan. 13-16 — Contact: PTC, Honolulu, Hawaii (808) 941-3789.

National Retail Federation Retail Industry Convention and Exposition. New York, Jan. 13-16 — Contact: NRF Convention Registrar, New York, N.Y. (212) 563-5113.

Technical Conference on the X Window System. Boston, Jan. 14-16 — Contact: MIT Laboratory for Computer Science, Cambridge, Mass. (617) 253-8861.

JAN. 20 - 26

Data Visions '91. San Francisco, Jan. 20-23 — Contact: Earle Speranza, Wordtech Systems, Orinda, Calif. (415) 254-0900.

The Downsizing Conference. San Francisco, Jan. 21-22 — Contact: Digital Consulting, Andover, Mass. (508) 470-3880.

Unix Technical Conference. Dallas, Jan. 21-25 — Contact: Usenix Conference Office, El Toro, Calif. (714) 588-8649.

Infotext '91. Las Vegas, Jan. 22-23 — Contact: Bob Dale, Infotext Publishing, Capistrano Beach, Calif. (714) 493-2434.

Uniforum 1991. Dallas, Jan. 22-24 — Contact: Bob Linke, PEMCO, Des Plaines, Ill. (708) 299-3131.

JAN. 27 - FEB. 2

Communication Networks '91 Conference and Exposition. Washington, D.C., Jan. 28-31 — Contact: Michael Sullivan, World Expo Corp., Framingham, Mass. (508) 820-8268.

Network Computing Forum and Exposition. Washington, D.C., Jan. 29-31 — Contact: Christine Krajewski, World Expo Corp., Framingham, Mass. (508) 820-8126.

FEB. 3 - 9

Macapp Conference. Phoenix, Feb. 4-8 — Contact: Macapp Developers Association, Everett, Wash. (206) 252-6946.

Macintosh/N.Y. '91. New York, Feb. 5-7 — Contact: Peter Kimpton, Exposition Management, Waltham, Mass. (617) 290-0412.

Florida Educational Technology Conference. Tampa, Fla., Feb. 5-8 — Contact: Barbara Ann Cox, Office of Educational Technology, Tallahassee, Fla. (904) 488-0980.

NOMDA West Regional Convention. San Diego, Feb. 7-9 — Contact: Katy Dunn, NOMDA, Kansas City, Mo. (816) 941-3100.

FEB. 10 - 16

The Development Center Institute Conference. Orlando, Fla., Feb. 10-13 — Contact: Development Center Institute, Indianapolis, Ind. (317) 846-2753.

Video Expo. San Francisco, Feb. 11-15 — Contact: Debbie Rotolo, Knowledge Industry Publications, White Plains, N.Y. (914) 328-9157.

FEB. 17 - 23

SAS Users Group International Conference. New Orleans, Feb. 17-20 — Contact: SUGI Registration, SAS Institute, Cary, N.C. (919) 677-8000.

Northwest Computer Show. Minneapolis, Feb. 19-20 — Contact: Judy Koch, Plymouth, Minn. (612) 420-5376.

Trax User Group Conference. Long Beach, Calif., Feb. 19-22 — Contact: Anne Sifferman or F. Thomas Cox, Trax Softworks, Culver City, Calif. (213) 649-5800.

Multimedia '91. Orlando, Fla., Feb. 20-22 — Contact: Society for Applied Learning Technology, Warrenton, Va. (703) 347-0055.

FEB. 24 - MARCH 2

IEEE Conference on Artificial Intelligence Applications. Miami Beach, Fla., Feb. 24-28 — Contact: IEEE Computer Society, Washington, D.C. (202) 371-1013.

Share 76. San Francisco, Feb. 24-March 1 — Contact: Share Headquarters, Chicago, Ill. (312) 644-6610.

Communications Connections (Commconn '91). San Diego, Feb. 25-27 — Contact: Dimensions, Redwood City, Calif. (415) 591-0183.

Compcon Spring '91. San Francisco, Feb. 25-March 1 — Contact: Roger Anderson, Livermore, Calif. (415) 422-8572.

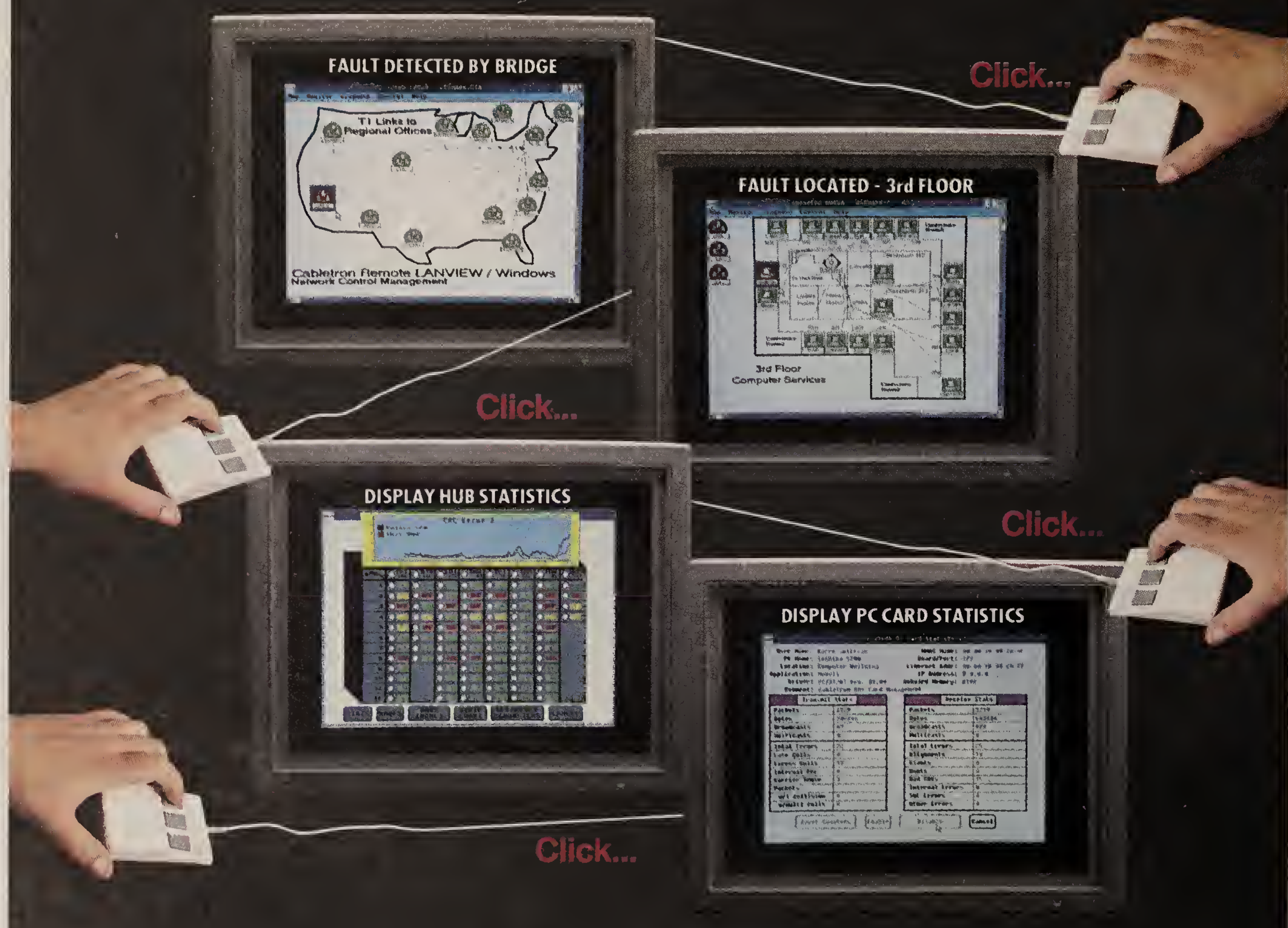
EDI and the Law '91. Washington, D.C., Feb. 26-27 — Contact: Data Interchange Standards Association, Alexandria, Va. (703) 548-7005.

European Wireless Systems Conference. Munich, Germany, Feb. 26-27 — Contact: Rita A. Tannenbaum, Probe Research, Cedar Knolls, N.J. (201) 285-1500.

Financial Market Data Conference. New York, Feb. 26-27 — Contact: Waters Information Services, Binghampton, N.Y. (607) 772-8086.

Strategic Planning Systems Conference. Tempe, Ariz., Feb. 27- March 1 — Contact: Pete Ashey, Conference Coordinator, Nardoni Associates, Lebanon, N.J. (201) 730-9444.

10BASE-T
NETWORK MANAGEMENT
MADE EASY.


FAULT DETECTED BY BRIDGE
T1 Links to Regional Offices
Cabletron Remote LANVIEW / Windows
Network Control Management
Click...
FAULT LOCATED - 3rd FLOOR
3rd Floor
Computer Services
Click...
DISPLAY HUB STATISTICS
Click...
DISPLAY PC CARD STATISTICS
Click...

Cabletron's Remote LANVIEW™/Windows is the world's first network management software package to offer completely integrated world-wide desktop LAN/WAN management from a central control console.

With just a click of your Personal Computer's mouse, Remote LANVIEW™/Windows allows you to manage Cabletron's complete line of ***Ethernet*** and ***Token Ring*** products including twisted pair, coaxial and fiber hubs. Remote LANVIEW™/Windows also lets you manage Cabletron's local and wide area bridges as well as the 48 different types of DNI™ PC cards currently available.

Cabletron's Remote LANVIEW™/Windows lets you maximize network efficiency by providing color-coded mapping, alarm indicators, complete throughput and error breakdown features. Features you can't afford to do without. Features which make the job of managing your complex network easier than ever.

Call today for details or a live demonstration.

CABLETRON
SYSTEMS
The Complete Networking Solution
A New York Stock Exchange Company

CORPORATE HEADQUARTERS
CABLETRON SYSTEMS, INC.
Cabletron Industrial Park
Rochester, NH 03867
603-332-9400

INTERNATIONAL OPERATIONS
CABLETRON SYSTEMS, Ltd.
Newbury, Berkshire, UK RG13 2PZ
011-44-635-580000

PRODUCT SPOTLIGHT

T1 SERVICES AND EQUIPMENT

Private/public mix stirs up new issues

BY MICHAEL HURWICZ

Before fractional and switched T1, it was easy to decide who controlled what part of the network: The carrier provided the raw bandwidth, and the user provided everything else, including multiplexing, networking, rerouting, monitoring and first-line troubleshooting.

With these newer T1 services and the appearance of carrier-offered frame relay, the division of labor is not so simple. With fractional T1, the carrier provides the multiplexing capability, while with switched T1 and frame relay, networking and rerouting are built into the service.

But that doesn't mean users can — or want to — throw the control of their networks to the carriers. For one thing, most customers will still need the full bandwidth of their point-to-point private T1 pipes, installing the newer public T1 services only where they are needed.

John S. Dykes

More importantly, frame relay, switched and fractional T1 may be economically attractive, but many customers are not yet comfortable with the degree of control they will have over these publicly-offered lines.

While carriers are good providers of transmission capacity, most people are not convinced that they can also manage an entire network, says Jim Kolbe, director of telecommunications at United Stationers Supply Co., the nation's largest wholesaler of office products.

"A T1 pipe can be used in so many different ways: for voice, compressed voice, various types of data protocols, frame relay, fast packet switching," he says. Each application requires different types of equipment and different management strategies.

Carriers, he continues, have been more experienced with point-to-point dedicated circuits that provide a fixed amount of bandwidth — the same kinds of circuits required for voice.

What people are looking for is a satisfactory method of testing and monitoring carrier performance and availability before entrusting their data networks to these services.

"I can't remember a time when so many new technologies and products became available to customers. The products are coming out faster than network management is keeping up with them," says Bernie Schneider, director of product management at U.S. Sprint Communications Co.

On-demand services such as switched T1 and frame relay bring new management problems that carriers have not yet addressed in a satisfactory way, Schneider says. For instance, users cannot afford to wait until the end of the month to find out how much switched T1 is costing them, he says. They need up-to-date information on use.

Another issue is determining how a particular data call is being routed so that if a user calls the company's network control center with a problem, both the network control staff and the carrier know which circuits and pieces of equipment to test. "Users and carriers are driving toward these services," Schneider says, "but there are no easy solutions in sight."

Currently, the carriers do provide performance reporting, and there are products emerging now that help users monitor and interpret those reports. One is Clearview Surveillance System from Clear Communications Corp. in Lincolnshire, Ill.

In addition, AT&T has announced that the Accumaster Services Workstation will support its T1 service starting in the first quarter of 1991.

This service will provide notification when user-defined thresholds for error statistics have been exceeded. The workstation will provide round-the-clock access to network management information and will also provide a rerouting capability.

But carriers offering fractional, switched or frame relay services still have some work to do before users are satisfied. At companies such as Progressive Property and Casualty Insurance Co. in Cleveland, the network is considered a "lifeline," says Dick Bradner, vice president of telecommunications. The network spans 232 locations and operates at a rate of 110 million transactions per month. The Systems Network Architecture (SNA) network includes 21 T1s and three fractional T1s used exclusively for data, Bradner says.

While he is happy with the flexibility, speed and cost-effectiveness of fractional T1, Progressive's dedicated point-to-point T1s still form the core of the network, and Bradner can manage that core with intelligent multiplexers and a Communications Management System from Racal-Milgo.

Fractional T1 services have been available from smaller carriers such as Williams Telecommunications and Cable and Wireless Communications, Inc. since early 1989, with major carriers such as AT&T, MCI Communications Corp. and Sprint joining the bandwagon in mid-1989.

Like other users, Bradner was attracted to fractional T1 for the cost savings — people can pay for 64K bit/sec. increments of bandwidth rather than leasing a full 1.5M bit/sec. line. Part of the cost savings, however, is reaped by moving networking intelligence from the customer premises to the public network.

For instance, users can reduce local-access charges by letting the interexchange carrier handle a "fan-out" service, which brings each digital circuit

Continued on page 78

INSIDE

One Lump or Three?
A guide to the cost-effectiveness of various T1 services. Page 78.

Buyers' Scorecard
Users rate Stratacom's IPX No. 1 in five of six top categories. Page 82.

Product Guide
A comprehensive listing of bit error rate testing tools. Page 89.

Hurwicz is a free-lance writer and consultant at MTI Group in Eastsound, Wash.

When — and if — to make a move

BY BRIJ BHUSHAN

Are you ready to move to a T1 network, or is fractional T1 or T3 more your speed? By determining break-even points, the charts at right can help you determine which to choose.

The top chart lists the cost of T1 services for various paired cities. The bottom chart can be used to perform a break-even analysis between the various T1 options.

There are two steps in the process:

- First, determine the mileage between the two locations for which communications are needed (the horizontal axis). Read across to the intercept with the T1 vs. AT&T's Dataphone Digital Service (DDS), fractional or T3 curves.

Round the number from the vertical axis to the next higher integer. This number represents the number of circuits at which the cost of provisioning is the same as the cost of going to the next higher-speed circuit.

- Second, determine the number of circuits that are needed to satisfy the needs of your business. If that number exceeds the break-even number arrived at in the process above, a higher-speed line is likely justifiable, especially in light of the excess circuits available in the higher-speed circuit.

If the number of needed circuits is less than the break-even number, then on the basis of these economics alone, the cost of other services is less expensive. (Note that other factors may still swing the balance in favor of T1 and T3 services.)

For example, the break-even point between T1 and DDS service is anywhere from three to five DDS circuits. For a circuit mileage of 800 miles, four (3.357) DDS circuits equals the cost of one T1 circuit. If you needed a fifth DDS circuit, it would pay to order a T1 circuit.

The break-even point between T1 and T3 ranges from seven to 13 circuits, and the break-even point between T1 and 64K bit/sec. fractional T1 is anywhere from eight to 19 circuits. ●

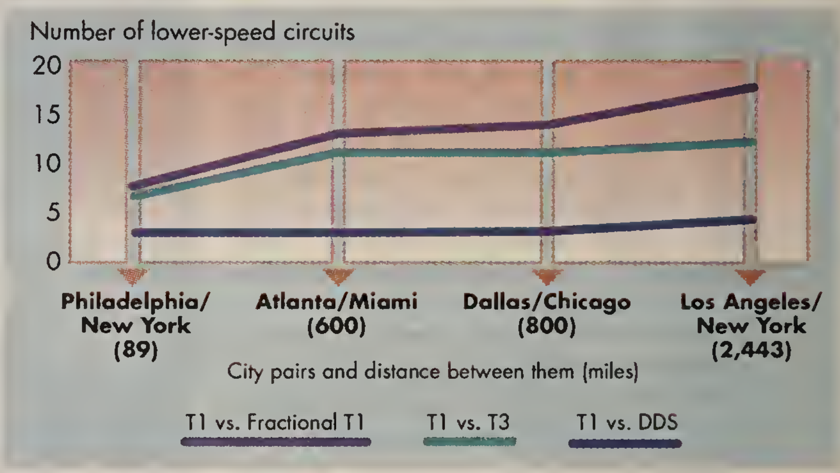
Bhushan is president of Reston Consulting Group, Inc., a consulting firm in Herndon, Va., that provides consulting services in wide- and local-area networks.

Comparative cost of various point-to-point AT&T interexchange services

City pair	DDS cost	Fractional T1 (1 DS0)	T1 cost	T3 cost
Philadelphia/New York (82 miles)	$883	$322	$2,793	$19,918
Atlanta/Miami (600 miles)	$2,014	$494	$6,685	$75,600
Dallas/Chicago (800 miles)	$2,282	$559	$8,185	$96,200
Los Angeles/New York (2,443 miles)	$4,482	$1,101	$20,500	$265,429

- Costs are far interexchange portions only (between AT&T's points of presence) and do not include any service functions or local-access service tariffs
- All tariffs are based on monthly charges, and no volume discounts are taken into account
- The tariffs in both charts are in accordance with AT&T's Federal Communications Commission Tariff No. 9 with an effective date of Oct. 12, 1990

Various AT&T interexchange tariff comparisons



- This chart is intended for guidance only and should not be used for comparing costs with actual network configurations
- Calculations include only the cost of interexchange circuits between different cities

Source: Reston Consulting Group

CW Chart: Doreen St. John

Continued from page 77

as close as possible to its network termination. If customers provide the fan-out, they have to pay for access charges from the T1 multiplexer to each termination point.

In addition, fractional T1 requires less intelligence of customer premises equipment. Because the carrier does the multiplexing, users supply only access multiplexers, which are less expensive and sophisticated than switching multiplexers or nodal processors. The access multiplexer provides access to a channel group and doesn't need to switch channel groups to different network locations.

Like fractional T1, switched T1 services also hand a degree of control to the carrier. With this service, users can get either full or fractional T1 bandwidth, but they get it on demand and pay for it only when they use it. Because the carrier handles the switching, customers do not need to have switching multiplexers on the premises.

AT&T announced switched T1 in November, with availability slated for the second quarter of 1991. MCI says it will have switched T1 and T3 in the third quarter of 1991, and Sprint offers no switched T1 services.

Higher bandwidth circuits will also be available from some carriers. Nynex Corp., for one, is preparing a tariff for switched T3, a 45M bit/sec. digital offering from which 28 T1 circuits can be derived.

Basic testing on switched T1 service is fairly easy: As with voice calls, users can simply attempt a connection and see how long it takes. Managing T1 bandwidth on demand for optimal price/performance is more difficult, however.

Current network management schemes offered by carriers for automatically bringing up and bringing down T1 bandwidth are based on time of day, Sprint's

A NETWORK OF RESOURCES AWAITS YOU IN KALAMAZOO.

And a new study by an independent consultant proves it. Find out how your company can plug into the many advantages of a location that's wired for growth: Kalamazoo County, Michigan.

"Feasibility For Location Of Data Processing Facilities In Kalamazoo County, Michigan," is yours free. Complete and mail the coupon below or call the CEO Council, Inc., 616/342-0000.

KALAMAZOO COUNTY, MICHIGAN
CEO Council

GET THE WHOLE STORY.
FIND OUT HOW YOU CAN ACCESS
OUR NETWORK OF RESOURCES.

☐ YES. I want to learn more about Kalamazoo County, Michigan. Please send my free information processing feasibility study to:

Name ____
Title ____
Company Name ____
Company Address ____
City/State/Zip ____

Send to: CEO Council, Inc., 100 W. Michigan Avenue,
Kalamazoo, Michigan 49007-3735 USA.

Let CICS Manage Itself

Automate Your CICS Regions with AOEF

- Start, stop and recover CICS regions.
- Time initiate transactions, batch job support and CEMT commands.
- Monitor and correct terminal status.
- Trigger journal jobs on demand.
- Ship early problem warnings to consoles, TSOids and to the HELP desk.
- Respond to CICS's WTOs, WTORs, abends and log messages with MVS activities, predefined WTOR responses and corrective CEMT commands.

The CICS Automated Operations Extension Facility is a proven approach to system managed CICS resources. Call us today for more information or a trial for AOEF

Netec International, Inc.
P.O. Box 180549 • Dallas, TX 75218
Telephone (214) 343-9744
FAX (214) 343-9009 • TLX 314419

Schneider says. This may be acceptable for voice traffic, which tends to be rather predictable, but data traffic, especially that associated with personal computers and local-area networks, is often bursty.

T1 bandwidth used for data may sit idle much of the time if it is brought up and down by time of day alone.

What is really needed, according to Schneider, is a protocol that would allow customer premises equipment and the public network to exchange information about network usage and performance. That protocol does not yet exist, he says.

Midlantic Banks, which is based in Edison, N.J., is planning to use switched T1 services in the future, but only for disaster recovery reasons.

Frank Ferrara, vice president of communications services at the bank, says that so far, he has had no reason to opt for the lower bandwidth on a constant-traffic basis.

When Ferrara does sign up with a carrier to perform switching services, it will be for backup reasons only. "Most carriers can't fight their way out of a paper bag" when it comes to sophisticated data networking, he says.

It is with frame-relay services that managers will begin to require very detailed and complex types of information, especially when public carriers begin offering them.

Public frame-relay services will combine various data streams in the same way that a T1 multiplexer or nodal processor does, eliminating the need for a T1 multiplexer or nodal processor on the customer's premises.

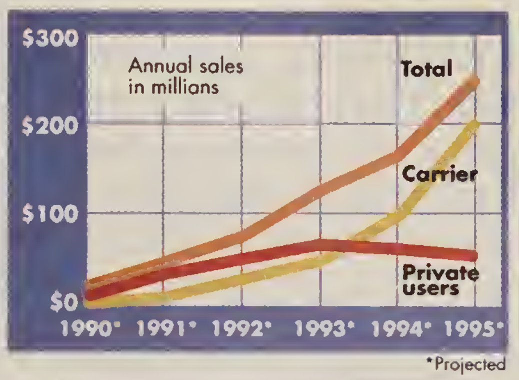
But neither MCI, Sprint nor AT&T will offer these public frame-relay services until certain standards — especially those handling congestion and data stream prioritizing — are established, and that probably won't be until sometime in 1991.

AT&T currently supports frame relay, but only for its Customer Network Offering II, which is a private networking service.

A coalition of frame-relay vendors — Northern Telecom, Inc., Digital Equipment Corp., Stratacom, Inc. and Cisco Systems, Inc. — has detailed new specifications that address some network management concerns.

T3 to go

Sales of T3 private network equipment are forecast to grow 70% annually, but carrier-based offerings will start to become standard fare for many firms in 1993



Source: The Yankee Group CW Chart: Doreen St. John

The specifications address Layer 1 (physical) connections, service enhancements, such as broadcasts, and a local management interface that provides a number of features, including congestion control, a physical "heartbeat" indicating that the hardware is still functioning and "logical link status messages," which provide information on the availability of the permanent virtual circuits provided by the frame-relay service.

However, there is no provision yet for collecting statistics on what happens to individual packets, how many packets are transferred during a given period of time or how long it takes a packet to traverse the network.

United Stationers is planning to install private frame-relay equipment. If the public carrier price is right, however, Kolbe says he may hand over all his frame-relay traffic.

That depends, however, on whether devices exist to monitor the carrier's performance, Kolbe adds.

He says he'd have to not only be able to determine the health of the underlying T1 pipe but also make sure the frame-relay protocol isn't creating problems.

"The carriers will have to add another level of network control," Kolbe says. "My ability to deploy public frame relay will depend on how effectively they can deploy that network control." •

Caregivers sought

Some users say it would make life a lot simpler and their networks more flexible if they could trust the carriers with network management.

"Today, when we run into a problem, we have to determine where the problem lies," says Jim Kolbe, director of telecommunications at United Stationers Supply Co. "If it's a line problem, we call the carrier. If it's a [private branch exchange] problem, we call the PBX vendor. If it's a multiplexer problem, we call the multiplexer vendor."

United Stationers is in the process of talking with vendors and carriers in hopes of turning a portion of the network over to a third party within a year or two.

Dick Bradner, vice president of telecommunications at Progressive Property and Casualty Insurance Co. in Cleveland, would also like to turn to carriers for installation and maintenance of sophisticated T1 networking equipment. Not only would it give him another alternative in configuring Progressive's network, but Bradner says he also feels the carriers could offer such services at competitive prices.

MICHAEL HURWICZ

WHEN COBOL MEETS OPEN SYSTEMS...

FAMILIARITY BREEDS CONTENT

If your organization has its fair share of the 80 billion lines of COBOL applications currently in use today, we don't have to sell you on its power and flexibility. But until now, you may not have associated COBOL with open systems.

Well, think again. As the world's leading vendor of open systems application development environments, Ryan McFarland has the compilers and development tools you need to fully realize the benefits of an open systems strategy. Unlike other COBOL's, RM/COBOL-85 allows for the construction and deployment of applications across multiple platforms with identical source, object and data. This translates into protection against application obsolescence, increased productivity, and reduced maintenance costs.

For a limited time, Ryan McFarland's Developer Pack will make it easier than ever to combine the benefits of open systems with the familiarity of COBOL...at a savings of more than 20% off the regular price. If you place your order before December 31, we will send you the DOS version of the RM/COBOL-85 compiler, bundled with RM/Panels and RM/CO* for only $1,495.

Offer valid until December 31, 1990 RM/COBOL-85, RM/PANELS, and RM/CO are trademarks or registered trademarks of Ryan McFarland Corporation All rights reserved

Our compiler is certified error-free at the highest level of ANSI X3.23 COBOL language standards. RM/Panels is a forms design and screen management system that provides programmers unmatched capabilities in developing modern application user interfaces. Tying it all together is RM/CO*, the integrated COBOL development environment that automates the cyclic edit/compile/debug process.

But you need to act quickly. The 20% discount on the RM/Developer Pack is only good through the end of the year. To order, call us today at 1-800-RM COBOL (1-800-762-6265). With your old friend COBOL as part of an open systems computing strategy, you'll see why at Ryan McFarland we believe that familiarity breeds content.

Call Us Today 1-800-RM COBOL RYAN MCFARLAND

IBM lets the
Now 486 technology

Without the proper venue, dazzling ability often falls short of expectations. That's certainly been the case with the Intel 486™ microprocessor, a processor that hasn't been utilized to its full potential. So that's what IBM set out to do. Just as it takes a seasoned jockey to turn a thoroughbred into a champion, it took IBM to give the 486 processor every opportunity to work its genius. Introducing IBM Personal System/2® Model 90 XP 486 and Model 95 XP 486.

From speed and storage capacity to graphics capabilities and upgradability, the new PS/2® Models 90 and 95 are designed to optimize the power of the Intel 486 processor and deliver a truly balanced performance—equipping you with solutions for today, and providing a platform of growth for tomorrow.

THE 90'S ARE A POWERFUL BREED.

Right out of the starting gate, the Models 90 and 95 will astound you with their power and sophistication. Featuring a 33 MHz processor and a 25 MHz processor that's easily upgraded to 33 MHz, they deliver blazing speed and balanced performance, expanding your capacity for computer-intensive applications like CAD/CAM, financial modeling and multimedia. The course between your data and your processing has also been strengthened—the Micro Channel™ 32-bit data path, combined with a lightning-quick data-transfer rate, not only optimizes the present power of the 486 processor by feeding it a steady stream of information, but also provides for processor enhancements and will allow you to benefit from advanced operating systems to come. Plus these other innovations: a wider 64-bit data path which optimizes the 486 processor's access to system memory; 4MB memory standard (expandable to 32MB); and a 256KB cache option for even greater speed. All in all, it's easy to see how the concept of computer "power" has been enhanced, and how IBM helps you take full advantage of every second of computing time.

BRILLIANCE ON DISPLAY.

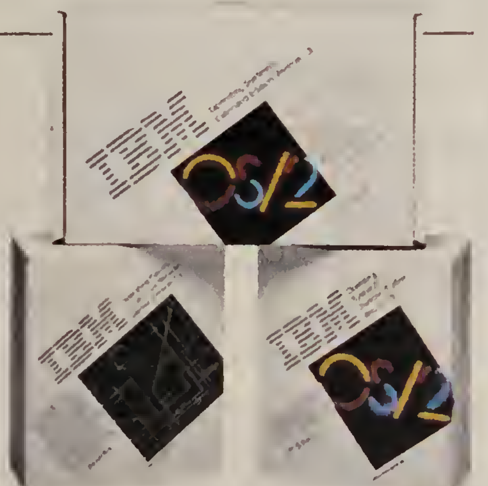
With increased power comes increased capabilities—the most visually stunning of which is Extended Graphics Array (XGA), standard on the PS/2 Models 90 and 95, and the heart of IBM's spectacular new display presentation.

With high resolution (1,024 x 768 pels) and execution that's significantly faster than VGA, XGA's sharper, clearer picture, coupled with the IBM 8515 color display, gives you swifter performance in windowed environments, and provides graphics-intensive applications such as desktop

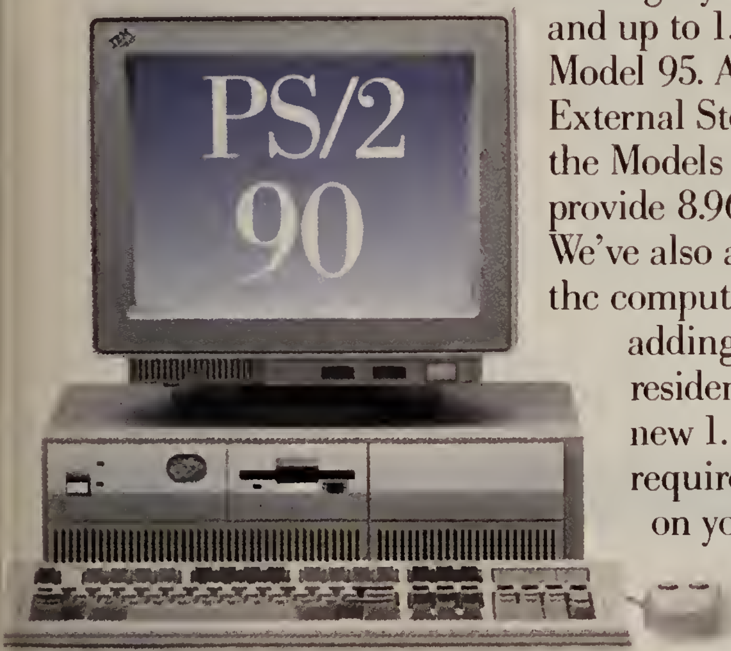
horses run.
realizes its full potential.

publishing, image processing and engineering design with a stunning new look.

FAST TIMES ARE IN STORE.



To satisfy even the most demanding storage needs, from LAN systems to data base management to numeric-intensive applications like financial analysis and modeling, IBM has one of the most advanced solutions available. IBM's super-fast SCSI hard disks are pure state-of-the-art performers. With additional hardfile expansion bays, the PS/2 Models 90 and 95 have enormous storage potential—up to .96 Gigabytes on the Model 90 and up to 1.6GB on the Model 95. And with the PS/2 External Storage Enclosures, the Models 90 and 95 can provide 8.96GB and more. We've also augmented the computing power by adding more flexibility to resident memory—our new 1.3 version of OS/2® requires as little as 2MB on your system. With this streamlined version you not only get more room for applications, but some users will experience a substantial performance increase in system functions as well. So when you need to make great strides with your computing power, you can count on IBM to give you terrific storage capability wherever you may need it.

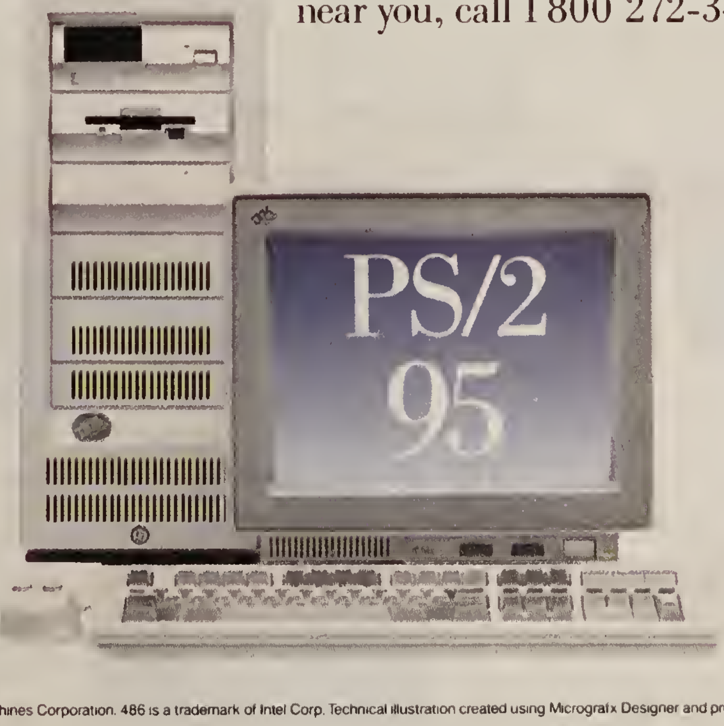


DESIGNED TO KEEP YOU OUT IN FRONT.

For the turns and hurdles ahead, you'll need technology that has foresight built in. Through a unique design, the Expandable Processor (XP) allows for an architected family of upgradable processor enhancements that can extend the life of your system. With Micro Channel busmaster adapters, you can incorporate multiple processors—like adding "computers" to your computer. And coupled with the industry-standard Small Computer System Interface (SCSI), you'll be able to support new applications and continue to build on your system as your needs become more varied and complex.

Features	IBM PS/2 Model 90	IBM PS/2 Model 95
Microprocessor		
Standard	80486	80486
Clock speed	25-33 MHZ	25-33 MHZ
Optional upgrade	33 MHZ	33 MHZ
Memory		
Standard	4MB (70ns)	4MB (70ns)
Maximum	32MB	32MB
Integrated Functions	Extended Graphics Array (XGA) and display port, dual DMA serial ports, DMA parallel port, pointing device port, keyboard port, diskette controller support for three drives, SCSI adapter with Cache.	
Fixed Disk Storage		
Standard	80-320MB	160MB-320MB
Display Modes		
APA Modes	XGA (includes all VGA modes) 640 x 480 x 256 colors/ 64 gray shades; 1024 x 768 x 16 colors/gray shades; hardware support for 132 column text mode; 16-bit direct color mode at 640 x 480 x 64K colors	
Available Expansion Slots	three 32-bit	six 32-bit
Bus Architecture		
Data path	MCA 32-bit	MCA 32-bit

With optimized performance in balance, power, speed and adaptability, the new PS/2 Models 90 and 95 are designed to keep you ahead of the pack. To find out more about the new leader in 486 computing, contact your IBM Authorized Remarketer or IBM marketing representative. For a remarketer near you, call 1 800 272-3438.



How're you going to do it?

PS/2 it!

IBM

IBM, Personal System/2, PS/2 and OS/2 are registered trademarks and Micro Channel is a trademark of International Business Machines Corporation. 486 is a trademark of Intel Corp. Technical illustration created using Micrografx Designer and provided courtesy of Micrografx, Inc., Richardson, Texas. © 1990 IBM Corp.

BUYERS' SCORECARD

Stratacom's IPX sweeps T1 multiplexer ratings

BY MICHAEL L. SULLIVAN-TRAINOR
CW STAFF

Pioneering new technology is a dangerous gamble. Winners can take the lead in the market or create a new one. Losers are destined for obscurity. For vendors, the difference between the two alternatives rests primarily on user acceptance.

Stratacom can rest easy based on the results of *Computerworld*'s Buyers' Scorecard on the leading T1 multiplexer product lines. Stratacom's users gave its IPX series top marks in 12 of 16 categories, including five of the six most important areas to all users surveyed, making it a clear winner in terms of overall satisfaction ratings.

Survey results are based on interviews with 34 users of Stratacom's IPX series and 50 users of each of the following product lines: Network Equipment Technologies Corp.'s (NET) IDNX series, Newbridge Network Corp.'s 3600 Mainstreet series and Timeplex, Inc.'s Link series. Each user group evaluated only the product it uses (see methodology next page).

Of the top four market leaders considered, Stratacom, a $30 million firm, has the smallest market share. It is also the only vendor to implement a fast-packet switch architecture. The other three use a time division architecture.

IPX's strengths are reflected in high user ratings for reliability (9.6 out of 10) — the most important criteria to all 184 users — and time required to reroute (9.0). The most glaring weaknesses surface in ratings of fractional T1 support (a last-place finish) and useful management reports (a first-place rating but IPX's lowest rating overall).

NET's IDNX series also garnered high user ratings. The product line was a close second in many of the areas where IPX came in first and received the highest rating in one of the top six categories — providing sufficient overall capacity. IDNX users rated it low in providing efficient asynchronous data interfaces, however, giving it the worst marks of the group in that area.

Newbridge's Mainstreet 3600, another relatively new series, received the top user rating in compatibility with carrier services — a characteristic that placed seventh in terms of user-assigned importance. It also received the best score for fractional T1 support.

At the moment, however, that achievement carries less weight with users, who assigned this consideration 14th place on their importance scale. Users rated Mainstreet low in routing and network management capabilities.

Timeplex's Link series received lukewarm to cold reviews from its users, garnering four third-place ratings for efficient synchronous and asynchronous data interfaces, parameter routing and fractional T1 support. Link users gave it the lowest rating in the 12 other categories, with the lowest being useful management reports (5.3).

Lower ratings for Timeplex's Link series may also be attributable to its being the oldest product group surveyed. Thirty-nine of the Timeplex users have had its products installed for three years or more, while users of the other products have had them installed for shorter periods of time. •

COMPUTERWORLD BUYERS' SCORECARD

T1 Multiplexers

Total scores reflect all criteria and their user-assigned importance
Response base: 50 per product, except Stratacom's IPX series (34)

Product	Three highest ratings	Three lowest ratings
Stratacom's IPX series SCORE 66	Reliability Time required to reroute Effective support for digital voice	Useful management reports Reasonable cost to upgrade Fractional T1 support
NET's IDNX series SCORE 64	Reliability Compatibility with carrier services Sufficient overall capacity	Useful management reports Reasonable cost to upgrade Reasonable initial costs
Newbridge's 3600 Mainstreet series SCORE 61	Compatibility with carrier services Reliability Sufficient overall capacity	Useful management reports Reasonable cost to upgrade Reasonable initial costs
Timeplex's Link series SCORE 58	Compatibility with carrier services Reliability Efficient synchronous data interfaces	Useful management reports Reasonable cost to upgrade Effective diagnostic tools

KEY RATINGS

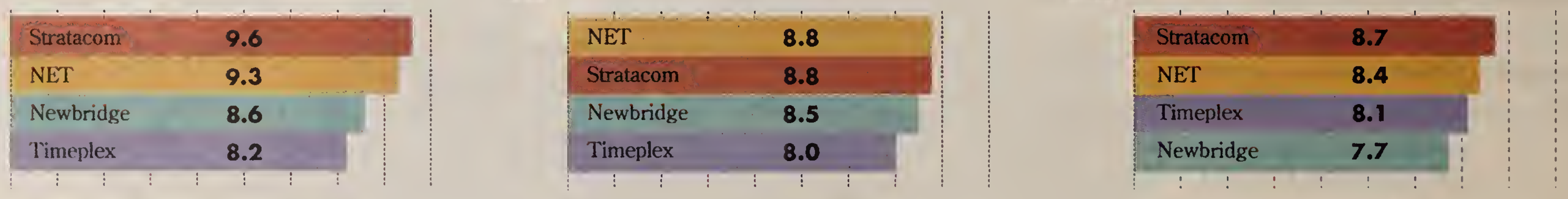
Stratacom users rate its IPX series highest in five of six areas considered most important by all users surveyed. While NET users rate the IDNX series just as high in providing sufficient overall capacity, they place it second in the other five criteria

User importance rating:

9.6 Reliability

8.8 Sufficient overall capacity

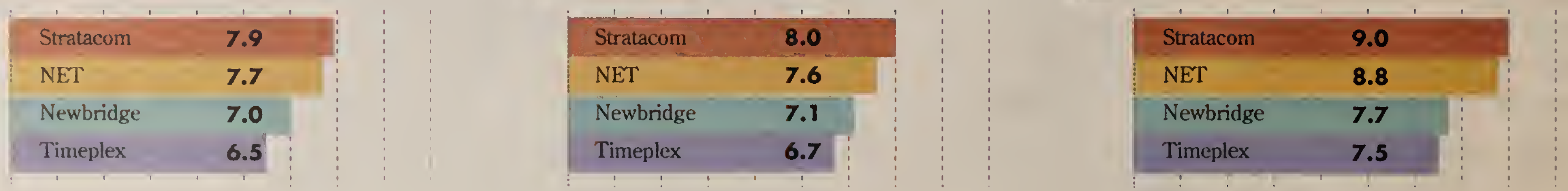
8.6 Efficient synchronous data interfaces



8.5 Effective diagnostic tools

8.4 Effective network management capabilities

8.4 Time required to reroute



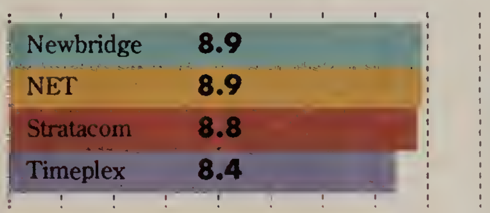
CW Charts: Paul Mock

A CLOSER LOOK

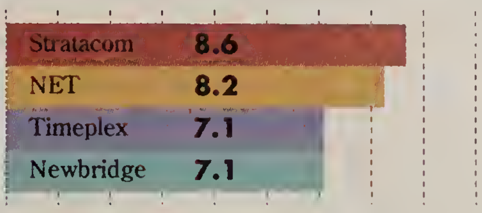
Stratacom's IPX series continues its high ratings, capturing five of nine top positions in remaining categories and tying with Newbridge and NET products in ability to interoperate. NET tops reasonable cost to upgrade, and Newbridge ties with NET in carrier services compatibility.

User importance rating:

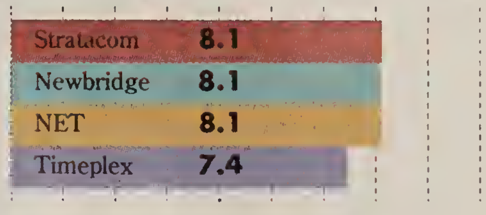
8.2 **Compatibility with carrier services**



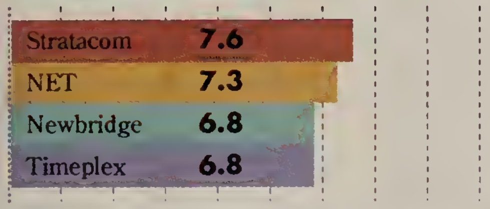
8.2 **Efficient parameter routing**



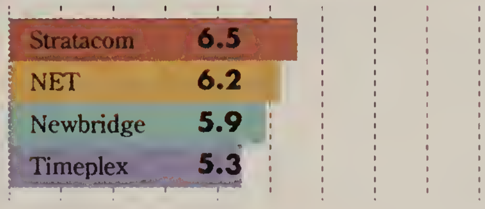
8.2 **Ability to interoperate with other products supplied by manufacturer**



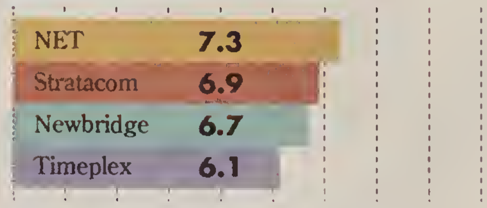
7.9 **Reasonable initial network configuration and installation costs**



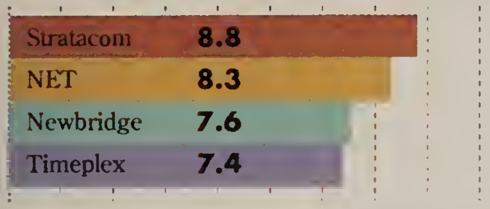
7.8 **Useful management reports**



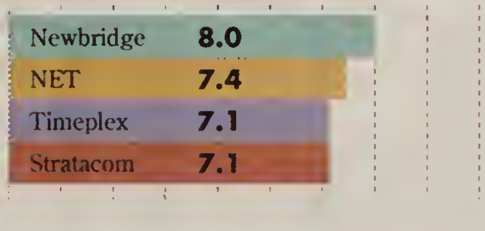
7.7 **Reasonable cost to upgrade**



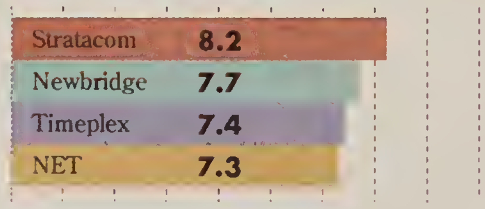
7.7 **Effective support for digital voice communications**



7.3 **Fractional T1 support**



7.0 **Efficient asynchronous data interfaces**



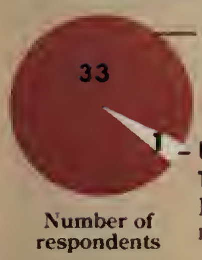
Loyalties

How likely would you be to purchase this product again if you were making the decision today?

(Reasons based on most frequently stated responses)

Stratacom's IPX series

Response base: 34

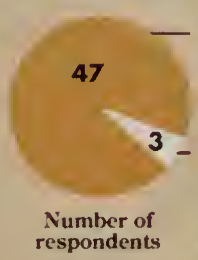


Likely
The reason: Service and support

Unlikely
The reason: No management statistics

NET's IDNX series

Response base: 50

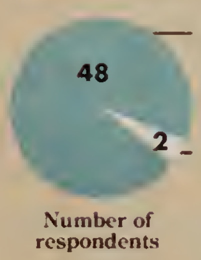


Likely
The reason: Reliability

Unlikely
The reason: Better/newer technology available

Newbridge's Mainstreet 3600 series

Response base: 50

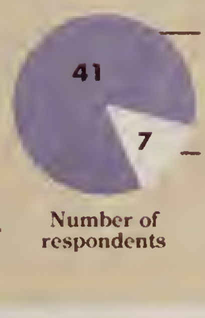


Likely
The reason: Reliability

Unlikely
The reason: Low-end equipment; poor voice compressor

Timeplex's Link series

Response base: 48



Likely
The reason: Reliability

Unlikely
The reason: Better/newer technology available

Verbatim

What do you like best/least about this product?

(Responses are based on the most frequently stated answers)

Stratacom's IPX series

Likes

Reliability
Fast-packet technology
Service and support

Dislikes

Management reports
Poor diagnostic/management feedback
Price to upgrade

NET's IDNX series

Likes

Reliability
Rerouting capabilities
Service and support

Dislikes

Cost
Report capabilities
Clocking issues and problems

Newbridge's Mainstreet 3600 series

Likes

Reliability
Flexibility
Ease of use

Dislikes

Network management software
Insufficient diagnostic tools
No mechanism to inform customers of upgrades

Timeplex's Link series

Likes

Reliability
Service and support
Flexibility

Dislikes

Diagnostics/monitoring
Price
Support

Vital statistics

Total number of respondents: 184

What is your position?

Data communications manager	143
IS manager	41

How many nodes are included on this network?

3 to 4	42
5 to 9	58
10 to 20	43
21 to 49	25
50 to 99	9
100 to 199	2
More than 200	4
No response	1

When was the first multiplexer from this vendor installed?

More than 5 years ago	14
3 to 5 years ago	58
1 to 3 years ago	79
More than 6 months ago	16
More than 3 months ago	16
No response	1

METHODOLOGY

Products rated in *Computerworld*'s Buyers' Scorecard on T1 multiplexers were chosen on the basis of vendor installed base and revenue. Users' responses to the top four major vendors' high-end products were compared.

Rating responses were obtained from 50 users for each product, with the exception of Stratacom's IPX. For that product, the minimum was lowered to 34 because of the vendor's low installed base.

The survey was conducted by telephone interviewers at First Market Research, which is located in Austin, Texas.

Total weighted scores were computed by multiplying the mean scores that users assigned to the importance of each criterion by the mean scores that each user group gave to its own products.

RESPONDENT PROFILE

The majority of users surveyed use the following models: Timeplex — Link 1 and Link 2; NET — IDNX 20, IDNX 40 and IDNX 70; Newbridge — Mainstreet 3600; and Stratacom — IPX 16 and IPX 32.

Respondents say that 39% of their T1 traffic is fractional T1 and that the systems carry an average of 65% data, 29% voice and 6% video traffic.

Sixty-three percent of the users work at companies that have annual revenue of more than $1 billion, and 29% are in the manufacturing industry.

Users say they would like to see the following features or functions added to their products (the most common responses are listed): Stratacom's IPX — fractional T1 support, frame-relay support and the ability to run diagnostics on specific cards from the console; NET's IDNX — enhanced network management, better user interface and lower-cost network management; Newbridge's Mainstreet — enhanced report writing, improved network management and frame-relay capability; and Timeplex's Link — better management and diagnostic tools, fast-packet technology and built-in terminals.

ACKNOWLEDGEMENTS

Computerworld would like to acknowledge the assistance provided by the following: Rosemary Cochran, Vertical Systems Group; Thomas Nolle, CIMI Corp.; Harry Reynolds, Reynolds Communications; Computer Intelligence; and International Data Corp.

SUN PROUDLY ANNOUNCES THE ULTIMATE STRIVING MACHINE.

SPARCstation™ 2. If you have people in your company who think limits were made to be exceeded, this is their kind of machine.

After all, it completely exceeds all our own limits. Last year, our SPARCstation 1 broke every record for price and performance. And became the best-selling workstation in history. But we went back to the drawing board. And created the SPARCstation 2 line.

POWER YOU CAN ACTUALLY USE.

To begin with, it gives you twice the performance. For about the same price. 28.5 MIPS. 21 SPECmarks. And 4.2 MFLOPS. There's also up to 96MB of RAM. And as much as 7.6GB of mass storage.

But more than just a hot engine, we give your people everything else they need to do their jobs. Unbelievably real graphics. Easy networking. And a huge selection of software.

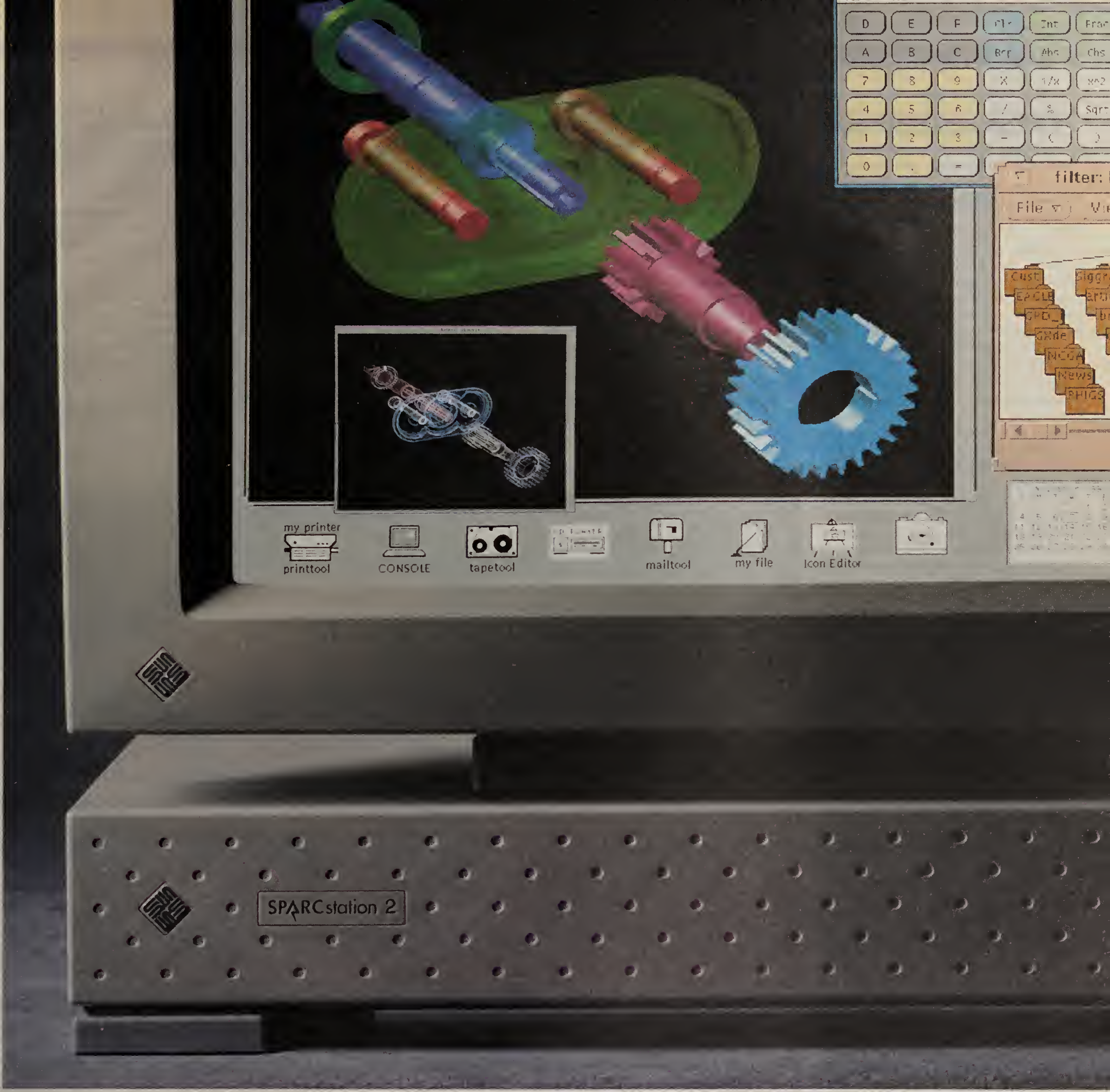
And when you put all that together, you get the kind of power that people can actually use.

THE WHOLE LINE IS AWESOME.
THE PRICES AREN'T.

Just look at SPARCstation 2GX. It delivers ultra-high speed at no extra cost. So it's ideal for electronic publishing. Financial analysis. And for electrical and mechanical designers who work with 2-D and 3-D wireframe drawings.

And that's just the most basic color model. We've also built SPARCstation 2GS. It lets mechanical designers and scientists create 3-D solid images in

© 1990 Sun Microsystems, Inc Sun Microsystems and the Sun logo are registered trademarks, and Sun, SunOS, OpenWindows, DeskSet and Computers that network people are trademarks, of Sun Microsystems, Inc. SPARCstation and SPARCware



24-bit true color. It's the kind of tool people absolutely hate to share. And from now on, they won't have to.

At the high end, there's SPARCstation 2GT. It does all the above, but it runs five times faster than the GS. And gives designers and engineers a level of image quality they've never seen at anywhere close to its price.

THE WHOLE THING MAKES PERFECT STRATEGIC SENSE.

At Sun, we make a full line of SPARC-based systems. From the lowest-cost RISC/UNIX® workstation in the world to servers that support hundreds of users. They're built to run the most widely accepted standards for workstations.

So they'll fit right in with your current equipment. And help your people get the information they need.

On the subject of software, there are more than 2100 SPARCware™ applications. Including the most popular PC software.

And with the OPEN LOOK® interface, your people will spend less time learning to use the system. And more time on their real jobs.

If you'd like to know more, call us at 1-800-821-4643. (From California, 1-800-821-4642.)

And we'll give your people what they've been striving for.

A better machine to strive with.

sun
microsystems

Computers that network people.™

are trademarks of SPARC International, Inc., licensed exclusively to Sun Microsystems, Inc. SPARC products are based on an architecture developed by Sun Microsystems, Inc. OPEN LOOK is a registered trademark of UNIX System Laboratories, Inc.

Fractions can stump multiplexers

On multiplexers, you can get various levels of functionality

BY ROSEMARY COCHRAN

If you opt for fractional T1 services, you might be in for a surprise: Not all T1 multiplexers directly support these services. To make things more confusing, neither price nor the level of sophistication of the equipment will tell you the machine's fractional functionality.

In fact, most end multiplexers in the $17,000 to $30,000 range are as functional for fractional T1 as networking multiplexers that cost three to four times that amount.

You can segment the three categories of multiplexers (see box) into three levels of fractional support:

- **Level 1:** *Multiplexers that are fractional T1-compatible.* Level 1 multiplexers can format a T1 aggregate into multiple virtual or logical circuits, either as individual DS0s or bundles of DS0s.

To do this, the multiplexer must support an internodal link interface module that conforms to the D4 format specification — that is, a T1 frame channelized as 24 DS0s.

Multichoices

Vertical Systems Group divides multiplexers into three categories:

- **Networking multiplexers** typically have proprietary architectures and are implemented to build wide-area enterprise backbone networks. These networks have mesh topologies, support multiple voice and data applications and require the flexibility to adapt to changing bandwidth and connectivity requirements.
- **End multiplexers with networking capability** are used to support small or relatively static enterprise networks. The key difference between products in this category and networking multiplexers is the degree of operations automation and network control.
- **End multiplexers** are designed for compatibility with carrier services and therefore have standards-based architectures. They are typically aimed at point-to-network configurations that connect user locations to a central office for access to carrier-based services. They are also used in point-to-point configurations to link two or three end-user locations in a private network.

D4 support ensures compatibility with the digital cross-connect system equipment that most carriers use to provide fractional T1 services.

- **Level 2:** *Multiplexers that offer fractional T1 networking support.* These machines can maintain single-point network control through fractional T1 circuits. For many people, this is the minimum level of functionality required.

To support single-point management, the multiplexer's aggregate module must be able to place a supervisory link within the DS0 bundle defined as an internodal link.

Supervisory links are an integral part of the telemetry and control system, which permits remote network management for T1 networks. These links are used to transport operations data, such as circuit provisioning information and alarm reports.

The amount of bandwidth required for the supervisory link is considered overhead bandwidth and varies by manufacturer. For some machines, the size of the supervisory link can be adjusted based on the size of the internodal circuit.

- **Level 3:** *Equipment that has multiple supervisory links.* With the high cost of individual local exchange channels, many users seek alternate methods to access carrier central offices. One common vehicle to avoiding access charges is multiplexed interfaces, such as Primary Rate Interface.

Similarly, using a single local channel to combine multiple fractional T1 circuits reduces the total number of local channels and their associated charges.

For the multiplexer to do this, a supervisory link must be included in each virtual fractional T1 aggregate. The virtual aggregates are split into separate interoffice channels at the carrier's central office for routing to different destinations.

One disadvantage to this approach is that you lose the inherent backup protection multiple physical channels provide. Users with critical applications find this implementation unacceptable. Others claim you can diminish the risk through normal contingency planning in the overall topological design of the network.

Multiplexers with Level 3 functionality can support multiple virtual aggregates — as distinct bundles — on a single physical aggregate. Each virtual aggregate represents a unique internodal link with its own supervisory link. For a T1 line, the maximum number of virtual aggregates is 24.

Each of the products in this category

Cochran is a principal at Vertical Systems Group, a market research and consulting firm in Dedham, Mass.

© 1990 NYNEX Corporation.

All too often, the technology that's allowed you to acquire so much information also dictates how you can use it.

But unless you're free to manage, access and share information the way you want to, you're not getting the most from your information system.

That's where NYNEX® comes in.

Because we're involved in virtually every aspect of the Information Industry, we can give you an unbounded look at the whole picture.

From cellular to software, from hardware to high-speed data highways, from

Three levels of fractional support

Product category	No integral support	Level 1	Level 2	Level 3
Networking multiplexers	Network Equip. Technologies *IDNX/70* Racal-Milgo *Omnimux 9000* Stratacom *IPX*	N/A	CASE/Datatel *DCP9900* Infatran *NX4600* Telematics *DX-500*	AT&T *Acculink 740/745* Avanti *ONX* General Datacomm *Megamux TMS* Newbridge *3600* Timeplex *Link 2+*
End multiplexers with networking capability	N/A	N/A	DSC Communications *CP2000* *CP4000* Racal-Milga *Omnimux 8000*	Amdahl *Multistar IV*
End multiplexers	General Datacomm *Megamux Plus*	Coastcom *D/I Mux III* Telco Systems *Route 24* Teltrend *Max I*	Avanti *ONC 100* Aydin *6248* CASE/Datatel *DCP9100* DSC Communications *CP1000s*	Amdahl *Multistar III* AT&T *Acculink 740* Newbridge *3630*

Source: Vertical Systems Group CW Chart: Doreen St. John

(see chart) can support as many as 24 separate supervisory links per T1 aggregate, with the exception of Avanti Communications Corp.'s ONX, which handles as many as 16 links.

What if your T1 multiplexer does not have the level of fractional T1 support you need? External equipment such as an intelligent channel service unit, format converter or channel bank with an N times DS0 data port can provide it. Depending on the implementation and specific equipment capabilities, fractional T1 support at Levels 1, 2 or 3 can be achieved.

One vendor that uses this approach is Network Equipment Technologies Corp. (NET), which acts as an OEM for an intelligent channel service unit from Cylink Corp. This external device formats an N times 64K bit/sec. aggregate from an NET IDNX as a bundle of DS0s. As many as two bundles can be defined, each with its own supervisory link.

This implementation allows Level 3 support, albeit for a maximum of two virtual aggregates per T1.

While the use of external equipment is a convenient way to achieve fractional T1 support, there are shortcomings to this approach if the external equipment cannot be managed via the T1 multiplexer's network management system.

You need to coordinate the management of these external devices and the multiplexers to ensure that fractional T1 circuits can be remotely configured and tested.

This assessment of product capabilities is based on the Vertical Systems Group's independent technical evaluation and represents functionality that was operational in end-user networks as of July 1990. This article is based on information from the recently released report, "Private Network Industry Analysis: 1990 - 1991." ●

ASK THE VENDOR

We have multiple locations that use analog and digital data DS0 circuits, with Metropolitan Fiber Systems in Houston as our local private-line carrier. Can you aggregate our DS0 circuits onto a DS1 circuit to increase our long-distance network efficiency?

Bill Gaffney
VP, Business Development
Satellite Transmission and Reception Specialists, Inc.
Houston, Texas

METROPOLITAN FIBER SYSTEMS, INC.: Using the Metrofiber DS1 Hub service, up to 24 individual analog or digital channels from multiple locations on a Metrofiber network can be aggregated onto a DS1 circuit for individual collection or distribution. In addition, the Metrofiber DS1 to DS0 Digital Cross Connect System enables Metrofiber to clock the individual circuits to ensure synchronized data transmission and minimal data loss.

With the Metrofiber Network Reconfiguration and Monitoring System, you can also have DS1 circuits reconfigured to consolidate individual local-access circuits.

We are using Netrix #1-ISS Integrated Switching System. Can we use its T1 multiplexing capabilities to remotely access the X.25 data stream at our end user's site? This would enable us to diagnose problems quickly and save us from dispatching an engineer out to the field.

Martin W. Haywood
New Service/
Business Development
Fedex International Transmission Corp.
Memphis, Tenn.

NETRIX CORP.: The #1-ISS allows you to use the integrated T1 multiplexing capabilities to send a copy of any circuit back to your central network management site. This way, engineers with data scopes and other sophisticated test equipment can examine the problem and reconfigure the equipment accordingly.

We give you freedom of information.

token rings to teleconferencing, from video to voice recognition, we offer the kind of freedom of choice in solutions that can really free up your information.

That's why scores of businesses, institutions and governments around the world have come to depend on NYNEX for their information needs. Call us at 1 800 535-1535. For solutions that will set you free.

Need to communicate? Need to compute? The answer is

NYNEX

To each his own T1 network

BY CHRISTOPHER HERBST

Choosing among the various T1 bandwidths is a very individualistic decision. What all T1 customers do have in common, however, is not only higher speed transmission but also cost savings.

At the Royal Bank of Canada, higher bandwidth was only one reason for going to T1. When the bank installed two T1 lines between its offices in Toronto and New York, it not only centralized all processing in the Canadian city but also turned out the lights for the New York data processing operations.

"By doing all the processing in Toronto, we, in effect, closed the data center in New York and made it into something like a switching center," says Brian Commerford, project manager for telecommunications facilities.

All in all, Commerford estimates, Royal Bank's T1 lines have saved the bank about $500,000 annually, allowing payback of the original investment in hardware — including leasing the lines and purchasing new multiplexers — within 10 months to a year.

Royal Bank chose two separate carriers to handle its two lines. In the U.S., it leases lines from AT&T that connect with a Bell Canada T1 at the Canadian border. The other T1, which connects with a Unitel Communications, Inc. T1 at the Canadian border, is provided by MCI Communications Corp.

If both lines were provided by the same carrier, Commerford explains, "you could end up with both channels running on the same path . . . Intrusion could damage both of them simultaneously."

……

For some companies, just keeping up with a fractional T1 channel's smaller increments can prove a challenge.

Minneapolis-based Cargill, Inc., which purchases, processes, stores, transports and merchandises agricultural and other bulk commodities throughout the world, uses T1 lines for domestic communications. However, for its European and Asian divisions, it communicates via fractional T1 lines.

Fractional T1 lets the firm "buy increments as we need them," says Reuben Lantto, Cargill's director of international telecommunications. Rather than starting with the full T1 bandwidth of 1.5M bit/sec., the firm can allocate bandwidth in 64K bit/sec. increments.

Commerford: *His T1 paid for itself*

Previously, Cargill leased long-distance lines for its voice and data communications at rates of $4,000 to $5,000 for a line to a single European customer.

Not only was it expensive, but "we just couldn't get a good connection" when making data transmissions, Lantto says.

Overall savings from switching to fractional T1 have been significant, he says, amounting to several hundred thousand dollars during the past three years.

Cargill chose Overseas Telecommunications, Inc. as its carrier because it supported the 64K bit/sec. base rate, which is the international standard. In the U.S., most equipment vendors support multiples of 56K bit/sec.

Even on fractional T1, Cargill can't always keep up with filling bandwidth. When expanding capacity from 128K to 256K bit/sec., it can be difficult to "fill up the next increment," Lantto says.

……

And then there are customers for whom even T3 bandwidth isn't enough.

Kaiser Health Plan, Inc./Kaiser Hospitals, Inc. is bulking up its private microwave T1 network with dual T3 lines — with 90M bit/sec. capacity — that will support high-bandwidth applications such as videoconferencing and transfer of large image files from ultrasound scans.

Lantto: *Fractional T1 saves money*

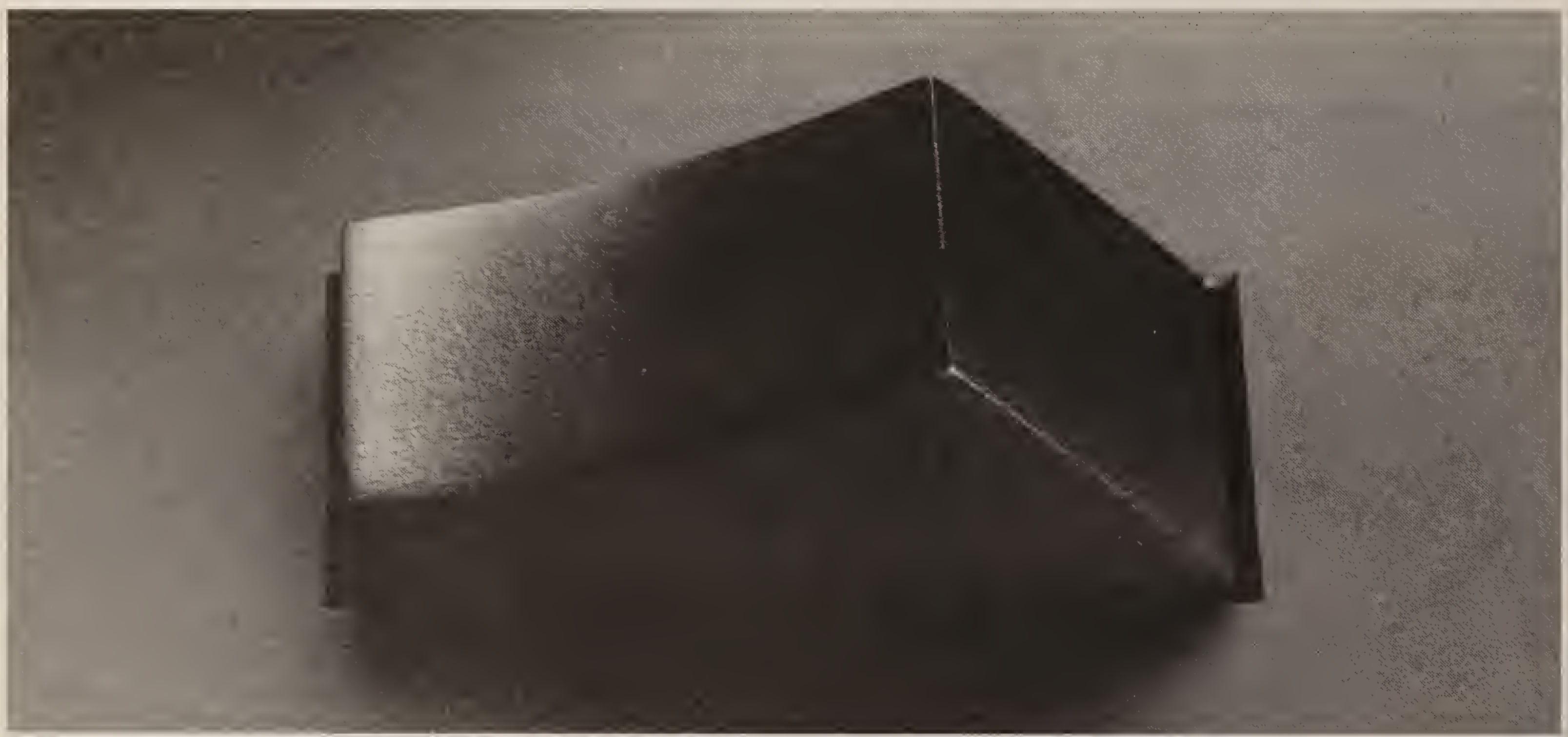
Demand for bandwidth is likely to skyrocket as image networking applications take off, says Joe Beaupre, manager of Kaiser's Telecommunication Network Division. "Everyone is putting in proposals to do transferring of image data, and we have a proposal to start testing on-line transfers of medical records."

Kaiser set up its network in 1988 to interconnect its internal voice and data lines in the Northern California region, using multiple T1 and T3 lines to connect nearly 50 sites.

The hospital had previously leased 56K bit/sec. data lines as well as voice lines from AT&T and Pacific Telesis. Although the new network cost $12 million, Beaupre says he expects payback to occur after 3½ years.

Even installing the T3 lines did not present a financial burden, especially compared with the cost of microwave towers and power supplies. "Putting in 45M bit/sec. lines really didn't increase the cost that much," he says. •

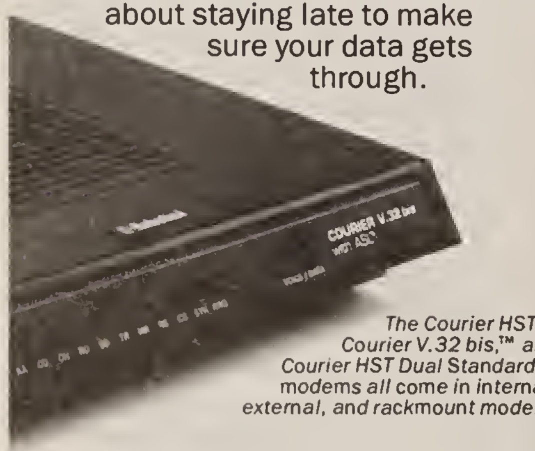
Herbst is a free-lance writer based in Washington, D.C.



Turn it on
and forget about it.

Forget about walking into work to find your message light blinking with last night's modem problems.

Forget about downtime. Forget about phone line problems and retransmitting. Forget about staying late to make sure your data gets through.



The Courier HST,™ Courier V.32 bis,™ and Courier HST Dual Standard™ modems all come in internal, external, and rackmount models.

A Courier™ high speed modem works so well, you can forget about it altogether.

It's reliable by design. The data pump has fewer parts. Less to go wrong.

And we test every Courier modem mercilessly before we send it out.

General Electric. Kodak. USWest. Forty-three of the Fortune 50 have relied on Courier modems for years, and they can't afford trouble any more than you can.

Only Couriers give you ASL™ to keep you at maximum speed.

You'll notice the difference the first time you dial. Modems with ASL™ connect up to three times faster than other V.32 *bis* modems. That irritating, expensive wait for the connection is over.

ASL is U.S. Robotics' Adaptive Speed Leveling.

All modems have to slow down for line noise. But two high speed Couriers working together will speed up again when conditions improve.

All other modems leave you stuck in "low" for the rest of the transmission. That can turn a $1 call into a $10 call.

So if you think a modem that gives you 38,400 bps throughput has to be temperamental, relax.

Nobody handles the hassle of dial-up lines better than U.S. Robotics®

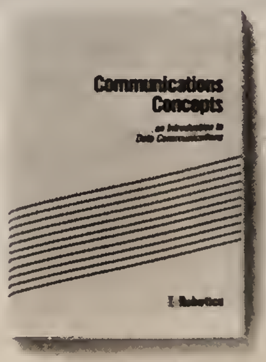
We're proud to say we make the most forgettable modems in the world.

USRobotics®
The Intelligent Choice in Data Communications

Free Data Communications Reference Guide: This 108-page illustrated book quickly answers your data communications questions.

Please Print
Name:
Title:
Company:
Address:
City: State: Zip:
Phone: ( )

Mail to: U.S. Robotics, Inc., Attn: Marketing Dept., 8100 N. McCormick Blvd., Skokie, IL 60076, or call us toll-free at 1-800-DIAL-USR. In Canada: 1-800-553-3560. In the U.K.: Miracom Technology, Ltd. 0473 233-888.



CPWD12/3/90

USRobotics and the U.S. Robotics logo are registered trademarks, and Courier, Courier V.32 *bis*, Courier HST, Courier HST Dual Standard and ASL are trademarks of U.S. Robotics, Inc.

PRODUCT SPOTLIGHT

Bit Error-Rate Testers

VENDOR	PRODUCT NAME	BIT RATE SUPPORTED (BIT/SEC.)	STORES AND RECALLS TEST SETUPS	SIZE CLASSIFICATION	DISPLAY SIZE (line x character)	LINE CONNECTION SUPPORTED	PERIPHERAL DEVICES SUPPORTED	LOCAL/REMOTE USAGE	GENERATES REMOTE LOOP-BACK	TEST TYPES[1]	FRAMING FORMATS SUPPORTED	LINE CODES SUPPORTED	AC POWER SOURCE REQUIRED	PRICE
ADC Telecommunications, Inc. **(612) 835-6800**	Netstar Performance Monitoring System	1.544M	Yes	Rack mount	PC controlled	Hard-wired installed system	Remote access port, printer, standard TL1 language interface via RS-232 ports	Both	Yes	Bipolar violation, framing errors, ESF CRC errors, DS1 signal frequency, all-ones, yellow alarm detection	Unframed, D4, ESF, DLC	AMI/bipolar, B8ZS, ZBTSI	Yes	Varies depending on size of network
	Series 2000 Test Set	1.544M	Yes	Portable	8 x 40	Jacks	Printer	Local	Yes	Bipolar violation, framing errors, ESF CRC errors, DS1 signal frequency, all-ones, yellow alarm detection	Unframed, D4, ESF, DLC	AMI/bipolar, B8ZS	Yes	Full-function DS1 test set. Bert can be added for $1,495.
Berry Test Sets **(800) 428-9267**	8406 L3	1.544M	No	Portable	NP	Jacks	Remote access port	Both	Yes	Bipolar violation, framing errors, ESF CRC errors, phase jitter analysis, all ones, yellow alarm detection	D4, ESF	AMI/bipolar, B8ZS	No	$1,995

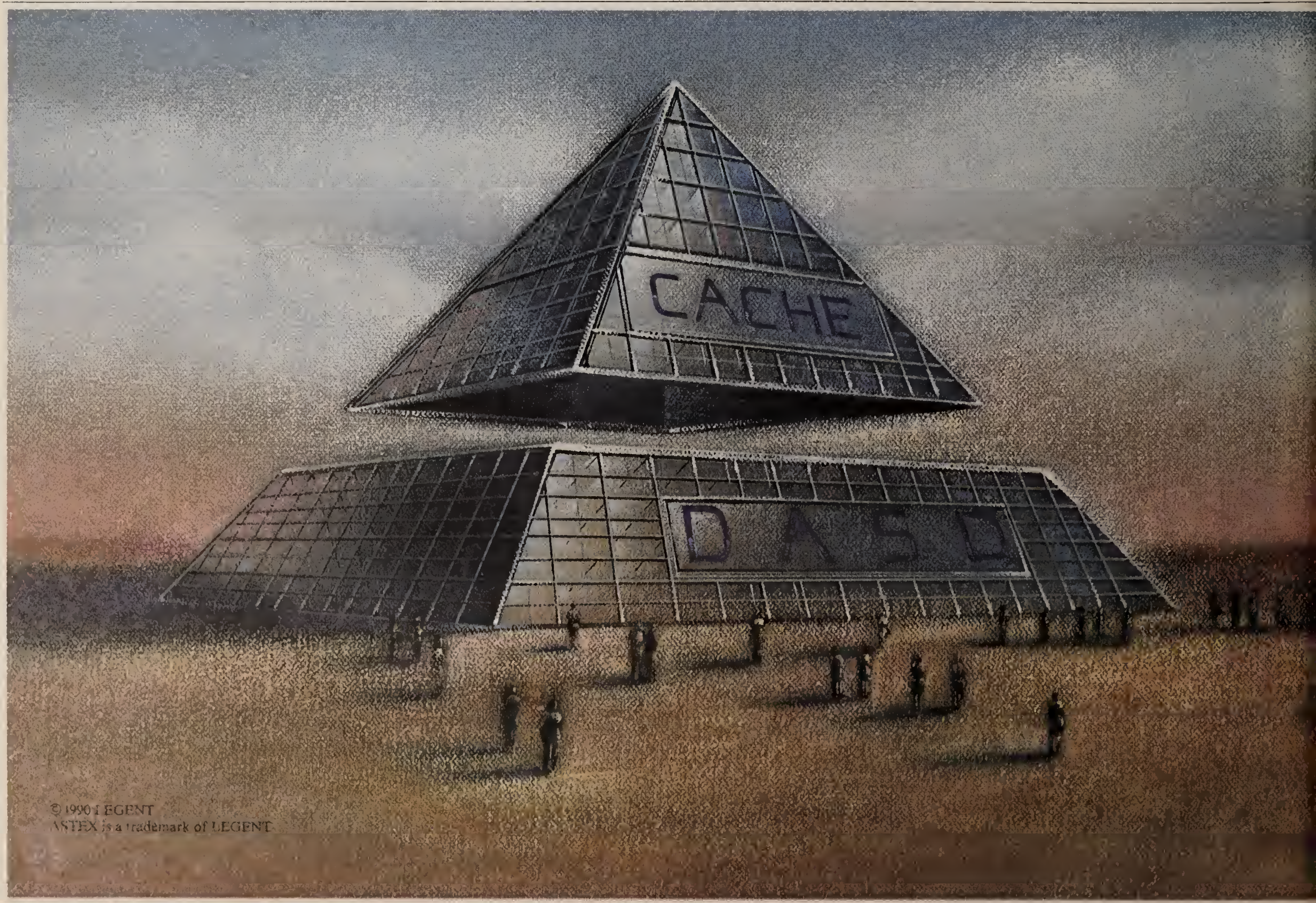
[1] Includes bit error-rate tests.
[2] SLC is a registered trademark of AT&T.
[3] Generates remote loop-back for 1.544M bit/sec. rate only.

The companies included in this chart responded to a recent survey conducted by *Computerworld*. When a vendor is unable to provide specific information about its product, the abbreviation NP (not provided) is used. When a question does not apply to a vendor's product, the abbreviation NA (not applicable) is used. Further product information is available from the vendors.

What would it take
to outperform DASDMON?

PRODUCT SPOTLIGHT

VENDOR	PRODUCT NAME	BIT RATE SUPPORTED (BIT/SEC.)	STORES AND RECALLS TEST SETUPS	SIZE CLASSIFICATION	DISPLAY SIZE (line x character)	LINE CONNECTION SUPPORTED	PERIPHERAL DEVICES SUPPORTED	LOCAL/REMOTE USAGE	GENERATES REMOTE LOOP-BACK	TEST TYPES[1]	FRAMING FORMATS SUPPORTED	LINE CODES SUPPORTED	AC POWER SOURCE REQUIRED	PRICE
Case/Datatel **(609) 424-4451**	DCP2083	1.544M, 2.048M	No	Portable	LCD	DA-15S, V.35, RS-232, RS-422	Printer	Both	Yes	Bipolar violation, framing errors, ESF CRC errors, DS1 signal frequency, all-ones detection	D4, ESF, G.703 European	AMI/bipolar	Yes	$4,975
Compression Techniques Corp. **(703) 478-5355**	T-Star 1500, 1096A, 1000	1.544M, fractional T1	Yes	Handheld, portable	16 x 24	DB15, RJ48 Bantam jacks	Remote access port, printer	Both	Yes	Bipolar violation, framing errors, ESF CRC errors, DS1 signal frequency, all-ones, yellow alarm detection	D4, ESF, SLC/96[2]	AMI/bipolar, B8ZS	No	$4,995, $5,295, $3,995 (options available)
Datacom Technologies, Inc. **(206) 355-0590**	Exbert T1	1.544M	Yes	Handheld	2 x 16	Clips, jacks, DA-15S, 8 pin modular, V.35	Remote access port, printer	Local	No	Bipolar violation, framing errors, ESF CRC errors, DS1 signal frequency, all-ones detection, smart jack	Unframed, D4, ESF, SLC/96	AMI/bipolar, B8ZS	No	$1,995
	Exbert FT1	1.544M, fractional T1	Yes	Handheld	2 x 16	Clips, jacks, DA-15S, 8 pin modular, V.35, Bantam jacks	Remote access port, printer	Both	Yes	Bipolar violation, framing errors, ESF CRC errors, DS1 signal frequency, all-ones , yellow alarm detection, smart jack	Unframed, D4, ESF, SLC/96	AMI/bipolar, B8ZS	No	$2,995
	Exbert Montitor Link Analyzer and Channel Monitor	1.544M	Yes	Handheld	2 x 16	Clips, jacks, DA-15S, 8 pin modular, V.35	Remote access port, printer	Both	Yes	Bipolar violation, framing errors, ESF CRC errors, phase jitter analysis, DS1 signal frequency, all-ones , yellow alarm detection, smart jack	Unframed, D4, ESF, SLC/96	AMI/bipolar, B8ZS	No	$3,000
DCM Industries, Inc. **(415) 429-9500,** **(800) 423-9550**	TIM/96 Handheld T1 Monitor	1.544M	No	Handheld	4 digit LCD	Clips, jacks	None	Local	No	Bipolar violation, counts framing errors, ESF CRC errors, all-ones, yellow alarm detection	D4, ESF, SLC/96	AMI/bipolar, B8ZS	No	$850
	DI-20	1.544M	No	Portable, rack mount	5 digit LED	Clips, jacks, RJ11, RS-232, DB9 receive and transmit clock	Remote access port, printer, built-in modem	Both	No	Bipolar violation, counts framing errors, ESF CRC errors, all-ones, yellow alarm detection, VF-monitor/speaker, VF-input/output	D4, ESF	AMI/bipolar, B8ZS	Yes	$2,995, $120 (optional carrying case)
	BT-10 Ber test set	1.544M	Yes	Portable, rack mount	4 x 40	Clips, jacks, RJ11, RS-232, central office repeater power	Remote access port, printer, built-in modem	Both	Yes	Bipolar violation, counts framing errors, ESF CRC errors, DS1 signal frequency, all-ones, yellow alarm detection, VF-monitor/speaker, VF-output	D4, ESF	AMI/bipolar, B8ZS	No	$2,995, $120 (optional carrying case), $350 (internal battery pack)



© 1990 LEGENT
ASTEX is a trademark of LEGENT

VENDOR	PRODUCT NAME	BIT RATE SUPPORTED (BIT/SEC.)	STORES AND RECALLS TEST SETUPS	SIZE CLASSIFICATION	DISPLAY SIZE (line x character)	LINE CONNECTION SUPPORTED	PERIPHERAL DEVICES SUPPORTED	LOCAL/REMOTE USAGE	GENERATES REMOTE LOOP-BACK	TEST TYPES[1]	FRAMING FORMATS SUPPORTED	LINE CODES SUPPORTED	AC POWER SOURCE REQUIRED	PRICE
Electrodata, Inc. **(216) 663-3333**	TTS 3	1.544M, fractional T1	Yes	Handheld	2 x 16	Clips, jacks, DA-15S, 8 pin modular	Remote access port, printer, modem	Both	Yes	Bipolar violation, counts framing errors, ESF CRC errors, DS1 signal frequency, all-ones, yellow alarm detection	Unframed, D4, ESF, SLC/96, D1D, D2	AMI/bipolar, B8ZS	No	$4,495, $995 (fractional T1 module)
Hard Engineering, Inc. **(205) 533-2663,** **(800) 367-3126**	705T/WAN	1.544M, fractional T1	Yes	Portable	25 x 40	Bantam jacks	Remote access port, printer	Both	Yes	Bipolar violation, framing errors, ESF CRC errors, DS1 signal frequency, all-ones, yellow alarm detection	D4, ESF, G.703 European	AMI/bipolar, B8ZS, ZBTSI	Yes	$11,000
Hekimian Laboratories, Inc. **(301) 590-3600**	Model 6301 DS1 Performance Unit	1.544M	Yes	Portable, rack mount	2 x 40	Jacks, barrier strip	Remote access port, printer	Both	Yes	Bipolar violation, counts framing errors, ESF CRC errors, all-ones detection, frame slips, excessive zeros	Unframed, Autoframed, D4, ESF	AMI/bipolar, B8ZS	No	$4,475
	Model 3705/3707 PCM/VF Communications Test System	1.544M	Yes	Portable, rack mount	1 x 40	Jacks, RS-232C, barrier strip	Remote access port, printer	Both	No	Bipolar violation, counts framing errors, ESF CRC errors, phase jitter analysis, DS1 signal frequency, all-ones, yellow alarm detection, errored second, excessive zeros	ESF, SLC/96, D1D, D2, D3/D4	AMI/bipolar, B8ZS	No	$10,795
	Model 3706 PCM-30/VF Communications Test System	2.048M	Yes	Portable, rack mount	1 x 40	Jacks, barrier strip	Remote access port, printer	Both	No	Bipolar violation, counts framing errors, ESF CRC errors, phase jitter analysis, DS1 signal frequency, all-ones, yellow alarm detection, errored second, excessive zeros	G.704 European	AMI/bipolar	No	$11,495
Hewlett-Packard Co. **(408) 553-7030**	HP37701A T1 Tester	1.544M	Yes	Portable, rack mount (option)	21 x 44	Clips, jacks, DA-15S, 8 pin modular, RJ48	Remote access port, printer, HP15901A (Datacom test module)	Both	Yes	Bipolar violation, framing errors, ESF CRC errors, DS1 signal frequency, all-ones, yellow alarm detection	D4, ESF, SLC/96	AMI/bipolar, B8ZS	No	$4,700
International Data Sciences, Inc. **(401) 333-6200**	Model 76B Bit Error-Rate Tester	1.544M, fractional T1, 2.048M	No	Handheld	2 x 48	DA-15S	None	Both	Yes	Bipolar violation, framing errors, ESF CRC errors, all-ones, yellow alarm detection	D4, ESF, G.703 European	AMI/bipolar, B8ZS	Yes	$2,000
Network Communications Corp. **(612) 944-8559**	7100 Network Probe	1.544M, fractional T1, 2.048M, 10M	Yes	Handheld	25 x 80	Clips, jacks, DA-15S, 8 pin modular, V.35, RS-232C, RS-422/423/449, Bantam jacks	Remote access port, printer	Both	Yes	Bipolar violation, framing errors, ESF CRC errors, phase jitter analysis, DS1 signal frequency, all-ones, yellow alarm detection, red alarm, blue alarm detection	Unframed, D4, ESF, D1D, D2, D3, 2M/CEPT, Multiframe	AMI/bipolar, B8ZS, B7, HDB3	No	$11,995

A monumental feat.
ASTEX™ from LEGENT.

The only product that's advanced enough to manage the storage hierarchy. Developed by the company that brought you DASDMON. The company that continues to set the standards for managing storage performance.

With ASTEX, LEGENT brings you a product that not only provides unique DASD and cache measurements, but also delivers expert service-level recommendations for response-time problems across today's storage hierarchy.

In short, ASTEX offers you the most automated, results-oriented process for delivering quality service at minimal cost.

The ASTEX performance experts identify storage problems based on user-defined requirements. Even more importantly, these components ensure effective utilization of your storage resources.

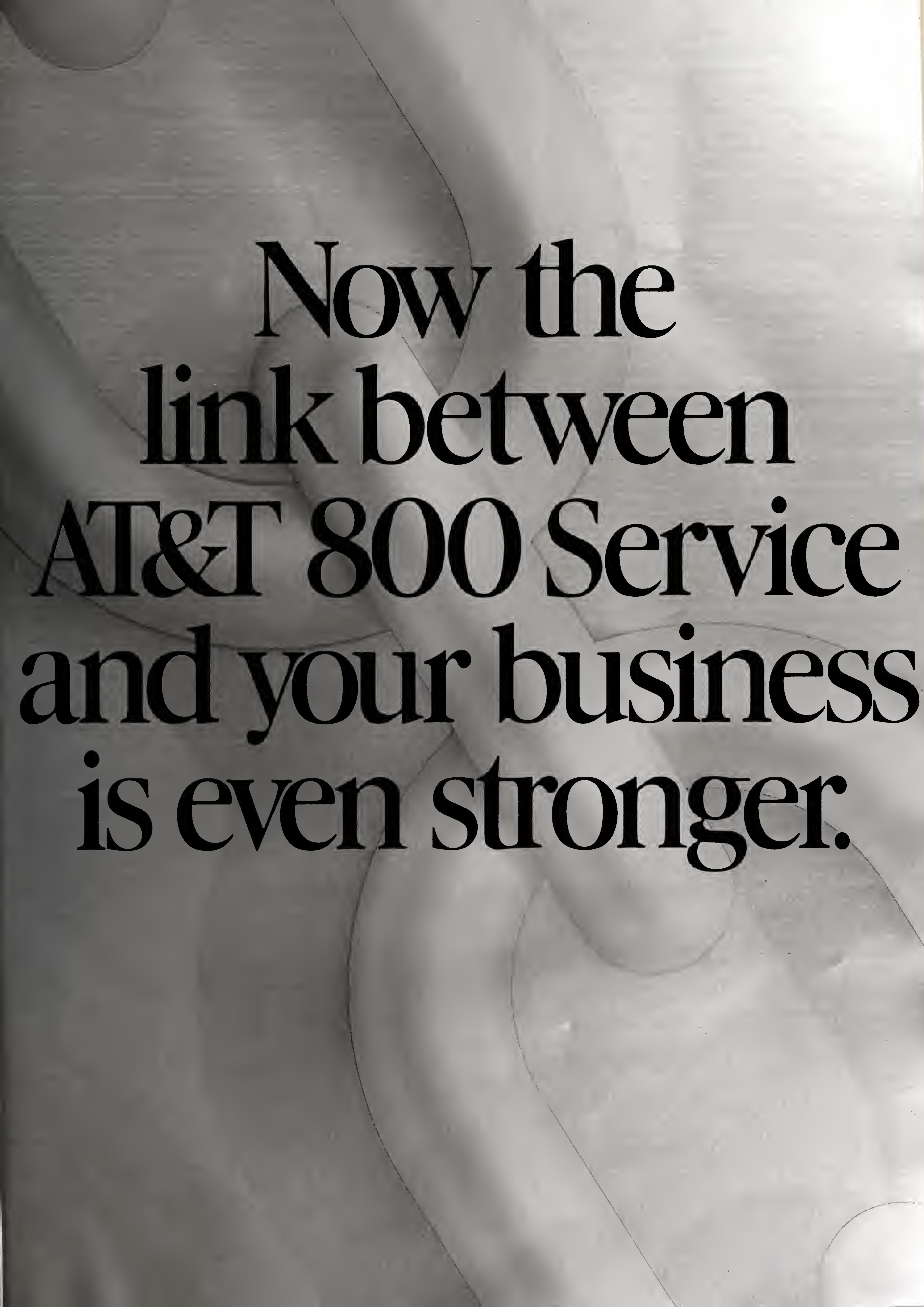
Managing the storage hierarchy is a constant challenge. ASTEX eliminates the complexity and provides the information you need to get the job done. It's that simple.

ASTEX: The Automated Storage Expert. It has what it takes to achieve performance goals in all environments. From LEGENT. The only company that could accomplish such a monumental feat.

To find out how you can make ASTEX an integral part of your MVS storage management process, contact your local LEGENT account representative or call 800-323-2600 (412-323-2600 in Pennsylvania). Ask for extension 1184.

LEGENT

VENDOR	PRODUCT NAME	BIT RATE SUPPORTED (BIT/SEC.)	STORES AND RECALLS TEST SETUPS	SIZE CLASSIFICATION	DISPLAY SIZE (line x character)	LINE CONNECTION SUPPORTED	PERIPHERAL DEVICES SUPPORTED	LOCAL/REMOTE USAGE	GENERATES REMOTE LOOP-BACK	TEST TYPES[1]	FRAMING FORMATS SUPPORTED	LINE CODES SUPPORTED	AC POWER SOURCE REQUIRED	PRICE
Phoenix Microsystems, Inc. (205) 721-1200, (800) 866-8480	1541/1542 Quick Test & Quick Send	1.544M	No	Handheld	LED	Clips, jacks	None	Local	No	Bipolar violation, framing errors, ESF CRC errors, all-ones, yellow alarm detection, out of frame, loss of signal, T1; 403 parameters	D4, ESF	AMI/bipolar, B8ZS	No	$795 (1541), $495 (1542)
	5575A T1 Bert	1.544M, 2.048M, DS0	Yes	Portable, rack mount	2 x 40	Clips, jacks, DA-15S, 8 pin modular	Remote access port, printer	Both	Yes	Bipolar violation, framing errors, ESF CRC errors, DS1 signal frequency, all-ones, yellow alarm detection, frame slips, clock slips, frequency, wander	D4, ESF, G.703 European	AMI/bipolar, B8ZS	No	$3,995
	5500A Communications Analyzer	1.544M, fractional T1, 2.048M, DS0A, DS0	Yes	Portable, rack mount	16 x 32	Clips, jacks, DA-15S, 8 pin modular, V.35, RS-449, TTL	Remote access port, printer	Both	Yes	Bipolar violations, framing errors, ESF CRC errors, phase jitter analysis, DS1 signal freqency, all-ones, yellow alarm detection, clock analysis, wander, Histogram	D4, ESF, G.703 European	AMI/bipolar, B8ZS	Yes	$6,995
	5148 T1 and Channel Access Test Analyzer	1.544M, fractional T1, DS0A, DS0B	Yes	Portable, rack mount	4 x 40	Clips, jacks, 8 pin modular	Remote access port, printer, RS-232	Both	Yes	Bipolar violation, framing errors, ESF CRC errors, DS1 signal frequency, all-ones, yellow alarm detection, clock analysis, wander, DDS, TMS testing	D4, ESF	AMI/bipolar, B8ZS	Yes	$7,995
Scientific Atlanta (404) 925-5067	AT9500E Digital Transmission Analyzer	1.544M, 2.048M, 44.736M	Yes	Portable	7 x 40	Jacks	Remote access port, printer, IEEE 488	Both	Yes	Bipolar violation, framing errors, ESF CRC errors, DS1 signal frequency, all-ones, yellow alarm detection	D4, ESF, G.703 European, DS3	AMI/bipolar, B8ZS, B3ZS, HDB3	Yes	$18,000
Sierra-LSI Jennings (408) 292-4025, (800) 227-8452	460A Printing Bert Analyzer	1.544M	Yes	Handheld	5 x 8-40	Jacks	Printer included	Local	Yes	Bipolar violation, framing errors, ESF CRC errors, DS1 signal frequency, all-ones, yellow alarm detection, CSU and NI looping codes	D4, ESF	AMI/bipolar, B8ZS	No	$3,295
T-Com Corp. (415) 964-3415	235A T-1 Transmission Analyzer	1.544M	Yes	Handheld	2 x 20	Jacks	Remote access port, printer, span power, VF monitor and measurement channel signaling devices	Both	Yes	Bipolar violation, framing errors, ESF CRC errors, phase jitter analysis, DS1 signal frequency, all-ones, yellow alarm detection	Unframed, D4, ESF, SLC/96	AMI/bipolar, B8ZS	No	$2,500, $125 (battery option), $850 (span power)
Tau-Tron (508) 692-5100	Model 5108, 5120, 5110	1.544M, T1C 3.152 MHz (5108, 5110), 2.048M (5120)	Yes	Portable, rack mount	2 x 80	Clips, jacks	Remote access port, printer	Both	Yes	Bipolar violation, framing errors, ESF CRC errors, phase jitter analysis, DS1 signal frequency, all-ones, yellow alarm detection, wink timing, signaling bit analysis	D4, ESF, G.703 European	AMI/bipolar, B8ZS, ZBTSI	No	$5,000
Tekelec (818) 880-7900	Chameleon 8000	1.544M, fractional T1	Yes	Portable, rack mount	16 x 40	Jack, DA-15S, 8 pin modular, V.35, RS-232, RS-449	Remote access port, printer, IEEE 488 (optional)	Both	Yes	Bipolar violation, ESF CRC errors, DS1 signal frequency, all-ones, yellow alarm detection, drop and insert of DS0 channels supported	D4, ESF	AMI/bipolar, B8ZS, ZBTSI	Yes	$7,750
Tektronix/LPCOM (415) 967-5400	TC 1000-B1/C1	1.544M, fractional T1, 2.048M	Yes	Portable	600 x 400 charac-ters	Jacks	Remote access port, printer	Both	Yes	Bipolar violation, framing errors, ESF CRC errors, DS1 signal frequency, all-ones, yellow alarm detection, drop and insert testing	D4, ESF, G.703 European, D1D, D2	AMI/bipolar, B8ZS	Yes	$8,075
Tele-Path Industries, Inc. (703) 982-8844	DS1 Loop Test Unit	1.544M, fractional T1	Yes	Portable, rack mount	8 x 40	Clips, jacks, DA-15S	Remote access port, printer	Both	Yes	Bipolar violation, framing errors, ESF CRC errors, DS1 signal freqency, all-ones, yellow alarm detection	D4, ESF	AMI/bipolar, B8ZS	No	$5,250
Telecommunications Techniques Corp. (301) 353-1550	T-Berd 107	1.544M	No	Handheld	2 x 16	Clips, jacks	Printer	Local	Yes	Bipolar violation, counts framing errors, ESF CRC errors, DS1 signal frequency, all-ones, yellow alarm detection	D4, ESF, SLC/96	AMI/bipolar, B8ZS	No	$2,395, $995 (transmit option)
	T-Berd 209A/211	1.544M	No	Portable, rack mount (option)	2 x 40	Clips, jacks, DA-15S, 8 pin modular	Remote access port, printer	Both	Yes	Bipolar violation, counts framing errors, ESF CRC errors, phase jitter analysis (211 only), DS1 signal frequency, all-ones, yellow alarm detection, frame slips, multiple pattern automated test systems	D4, ESF, SLC/96	AMI/bipolar, B8ZS, ZBTSI (optional)	No	$5,395 (209A), $6,695 (211)
	Fireberd 4000	1.544M, fractional T1, 2.048M, T1C, 8M	Yes	Portable, rack mount (option)	2 x 40	Clips, V.35, RS-449, Bantam, Weco 310	IEEE 488 and RS-232 remote control port, printer	Both	Yes	Bipolar violation, counts framing errors, ESF CRC errors, DS1 signal frequency, all-ones, yellow alarm detection level, Simplex Current, Data Link monitoring, VF transmit and receive	D4, ESF, G.703 and G.704 European	AMI/bipolar, B8ZS	Yes	$5,995
	Fireberd 6000	1.544M, fractional T1, 2.048M, T1C, 8M	Yes	Portable, rack mount (option)	2 x 40	Clips, V.35, RS-449, Bantam, Weco 310	IEEE 488 and RS-232 remote control port, printer	Both	Yes	Bipolar violation, counts framing errors, ESF CRC errors, phase jitter analysis, DS1 signal frequency, all-ones, yellow alarm detection, VF transmit and receive, wander, variable error insert rates	D4, ESF, G.703 and G.704 European	AMI/bipolar, B8ZS	Yes	$8,495
Telenex Corp., AR Diagnostic Products (703) 644-9000	Interview 7200 Turbo	1.544M, 2.048M	Yes	Portable, rack mount	21 x 16	Jacks, DA-15S	Remote access port, printer	Local	Yes[3]	Bipolar violation, framing errors, ESF CRC errors, yellow alarm detection, drop and insert, protocol analysis on selected channels, data protocol emulation	D4, ESF, G.703 European	AMI/bipolar, B8ZS, HDB3 (2.048M)	Yes	$23,000-$26,000
	Interview 7700 Turbo	1.544M, fractional T1, 2.048M	Yes	Portable, rack mount	21 x 16	Jacks, DA-15S	Remote access port, printer	Local	Yes[3]	Bipolar violation, framing errors, ESF CRC errors, yellow alarm detection, drop and insert, protocol analysis on selected channels, data protocol emulation	D4, ESF, G.703 European	AMI/bipolar, B8ZS, HDB3 (2.048M)	Yes	$28,000-$32,000
3M Dynatel Systems Div. (512) 984-1800, (800) 426-8688	Vencat F-80	1.544M	No	Portable, rack mount	5 digit	Jacks	Remote access port	Both	Yes	Bipolar violation, framing errors, ESF CRC errors, all-ones, yellow alarm detection	D4, ESF	AMI/bipolar, B8ZS	Yes	$4,995
Wandel & Goltermann Technologies, Inc. (919) 941-5730	PF-45 DS3/DS1 Analyzer	1.544M, 44.736M	No	Portable	2 x 20	Jacks	Built-in printer, RS-232C, IEEE 488	Both	Yes	Bipolar violation, counts framing errors, ESF CRC errors, all-ones, yellow alarm detection	D4, ESF, DS3, M13 frame, C-parity framing	AMI/bipolar, B8ZS, B8ZS at DS3	Yes	$10,475
Wilcom Products, Inc. (603) 524-2622, (800) 222-1898	D400 Digital Test System	1.544M, fractional T1	Yes	Portable, rack mount	4 x 80	Jacks	Remote access port, printer, modem	Both	Yes	Bipolar violation, framing errors, ESF CRC errors, phase jitter analysis, DS1 signal frequency, all-ones, yellow alarm detection	D4, ESF, SLC/96, CCIS, channel numbering, D1D, D2, D3	AMI/bipolar, B8ZS	Yes	$6,995
	D500 DS Channelyst	1.544M, fractional T1	Yes	Handheld	4 x 20	Clips, jacks	Printer	Local	No	Bipolar violation, ESF CRC errors, DS1 signal frequency, all-ones, yellow alarm detection	D4, ESF, SLC/96	AMI/bipolar, B8ZS	No	$2,495
Wiltron (408) 778-2000	Model 9967 High Capacity Digital Test Unit	1.544M	No	Rack mount	CRT	Wire wrap	TL1 interface to remote operations system	Re-mote	Yes	Bipolar violation, framing errors, ESF CRC errors, DS1 signal frequency, all-ones, yellow alarm detection	D4, ESF	AMI/bipolar, B8ZS	No	$6,000-$10,000 (depending on configuration)



Now the
link between
AT&T 800 Service
and your business
is even stronger.

AT&T completes the 800 call completion chain, Egress.

Now virtually nothing can stop 800 calls from getting to you. Because Egress, the link between you and our Network, has been made virtually indestructible. Thanks to some of the most innovative software anywhere and our exclusive 800 Assurance Policy.

This critical link has been strengthened by two new automatic routing features that instantly redirect incoming calls around problems on a call-by-call basis. The first, Split Access Flexible Egress Routing (SAFER),* automatically reroutes calls to your location if your primary route is ever down.

The second, Alternate Destination Call Redirection (ADCR),* reroutes calls to a different location, across town or across the country. In case of service disruption, both options virtually guarantee call completion.

If you prefer more hands-on control, we have 800 Routing Control Service. From your own network terminal, you can react in real-time to changing traffic patterns, adapt to regional promotions, and cover emergencies or closings. There's also 800 Command Routing Service that, once you call us, redirects calls to a preprogrammed alternative route within 5 minutes.

The fact is, we're so committed to reliability, we guarantee it with the AT&T 800 Assurance Policy. Every domestic AT&T 800 customer is automatically covered.**

Now the company with more ways to get every 800 call through offers you more security than ever.

800 calls that get through.
Another AT&T advantage.

For more details, call your AT&T Account Executive.

AT&T
The right choice.

© 1990 AT&T
*Available to AT&T MEGACOM® 800 Service customers.
**Except intrastate basic 800 service.

Women under glass

Despite a decade of advances, women still struggle to reach top ranks of IS management

BY MARYFRAN JOHNSON

Part of an occasional series.

LIFE *in* IS
WOMEN

Patricia Farwig remembers a lesson about succeeding in a male-dominated corporate world that came straight from Woody Hayes, the legendary football coach of Ohio State University's Buckeyes.

"Woody always said it doesn't matter how smart you are or what your connections are — as long as you're willing to work hard, they'll never outwork you," says Farwig, Hayes' former secretary and now vice president of telecommunications at Mellon Bank in Pittsburgh. "Those words always stuck with me."

Farwig is typical of the handful of women who have made it into upper information systems management positions. She is an admitted workaholic who spends more than 60 hours per week at her job. Yet while hard work and intelligence have taken her to the top, Farwig is still a rare breed in IS.

Despite numerical gains, women have far from equal footing at the slippery top of the IS management pyramid. While the actual number of women employed in computer-related occupations grew by 245,000 between 1985 and 1990, according to the U.S. Department of Labor Women's Bureau, most of the growth occurred in lower paying, nonmanagement positions.

Moreover, pay for IS women averaged 30% less than that for male counterparts doing the same jobs, the Labor Department says.

Analysts cite sexism, a lack of female role models and the historical male domination of computing as the main reasons for the inequities and slowed advancement of women in IS.

"It's discrimination," says Mike Williams, an economist at the Women's Bureau. "Men are in control, and they tend to promote men."

While optimistic about the future, more than 20 women managers, vice presidents, chief information officers and entrepreneurs interviewed by *Computerworld* agree that there is much room for improvement.

"No matter how much we complain, it's still a male-dominated world, and it is harder for women," says Janice Miller, vice president of marketing at Clusterlink in Silver Springs, Md.

Farwig adds: "All other things being equal, the male who has been there longer gets promoted. Things may be good now, but they could be a great deal better. Within IS, there are a lot of good women with very few places to go."

Numbers grow, not influence

Government statistics support the assertion that women in computing careers still have a long way to go:

- A 1988 National Science Foundation report on women and minorities showed that women make up 49% of all professionals but only about 30% of all computer scientists.
- The top layer of computer managers in 1988 totaled 53,000 people — 75% men and 25% women — according to the U.S. Equal Employment Opportunity Commission. Nearly a decade ago, there were only about 24,000 top managers in IS — 82% male and 18% female.

That 7% gain is slow progress indeed, female IS executives point out, particularly since the size of the profession overall grew by 270% during that period.

Scott Goldsmith/Black Star

Mellon Bank's Farwig: *"Within IS, there are a lot of good women with very few places to go."*

- Progress for minorities and minority women at the higher end of the career ladder has been at a standstill for nearly a decade. The commission's figures show that managers were 92% white and 8% minority in 1988 — the identical percentage found in 1980 and 1985.

"Women are continuing to accelerate in management levels, but not at the pace I anticipated," says Skip Tolette, a specialist in high-tech executive recruiting and a partner at the New York firm of Schmitt Bishop Tolette.

After placing a woman in the senior vice presidency of corporate systems at a major bank back in 1981, Tolette recalls thinking women were making "a major breakthrough." Yet in the past five years, only two of the 40 or so top IS executives he placed were women.

"I just don't see that much dramatic change," Tolette says. "You do read about women as CIOs in the press, but I think it's their novelty that gets them on the cover."

- The great majority of growth for women in IS has been in professional and nonmanagerial positions — a trend that many IS recruiters expect will continue.

Between 1984 and 1989, for example, the number of women systems analysts and computer scientists increased by nearly 85,000. But the numbers are deceiving: The actual percentage of women workers grew by only 1.7% over the previous five years, to 32.4%.

A recent survey of 100 corporate human resources directors conducted by Romac & Associates, a nationwide recruitment agency, found that systems analyst, project manager and programmer analyst were considered the most promising jobs for women in computing.

Salaries lag behind men's

Moreover, salaries for women in IS have not kept pace with those for males. In 1989, for instance, male systems analysts and computer scientists earned a median weekly salary of $747, while women earned $620. The $127 per week difference is virtually unchanged since 1984, according to Labor Department figures.

At higher levels of IS management — where six-figure salaries are closely guarded — it is harder to tell if women are keeping pace with men. Most believe that they are not. In a 1990 *Computerworld* investigation of top IS salaries, for example, only one woman, Elaine Bond at The Chase Manhattan

---

Johnson is a *Computerworld* senior editor, systems and software.

'Superwoman' dead and gone

Today, women executives acknowledge they cannot do it all

BY MARYFRAN JOHNSON

Common to the lives of many executive women in information systems is the sheer unpredictability of their career paths and their struggles with "the Superwoman complex."

Following are brief profiles of how several women have handled their IS career growth and the accompanying stress.

Kathy Hudson
Vice president and director, Corporate IS
Eastman Kodak Co.

Hudson launched her career by earning a bachelor's degree in business and economics from Indiana University. She joined Kodak in 1970 as a systems analyst in the distribution department. A stint as a financial analyst followed, then a move to communications and public relations.

By the mid-1980s, Hudson found herself managing Kodak's Instant Photography Division, which was dissolved after a 1986 court ruling upheld Polaroid Corp.'s patent infringement lawsuit.

"I never did have a definite career path in mind, and I believe that will be more the typical path of the future," she says. "In the past, people would pick a functional specialty and then climb a vertical ladder."

Hudson is also the mother of a toddler and is thus familiar with the career/family juggling act that so absorbs the "thirtysomething" generation.

"I could work 24 hours a day, but with a 2-year-old, I can only work from about 7:30 a.m. to 6 p.m.," she notes.

Hudson stresses the perspective and personal balance that family commitments bring: "Whether you are male or female, you have to make trade-offs if you have young children or are active in the community. You cannot do everything."

Susan Mersereau
Vice president and general manager
Weyerhaeuser Information Systems

Mersereau has collected college degrees in European culture and thought, history and education. But telecommunications ultimately held the greatest allure for the Portland, Ore., native.

She moved from teaching in inner-city Chicago schools to a federal job evaluating education programs, then returned to the Pacific Northwest as a planner for Seattle public schools. Her job as MIS director for the school district was the first time computers entered her career plan.

By 1980, she had joined Weyerhaeuser in Tacoma, Wash., as a planning analyst. Two years later, she was promoted to director of telecommunications, eventually becoming the first female manager of an operating division within the corporation. Earlier this year, *Business Month* magazine named Mersereau one of "100 women to watch in corporate America."

"Even if I had written the steps, I couldn't have known what was coming," she says. "To some extent, I've just followed my own course, continually asking the question: Does this make sense? How can we do this better?"

Now settled into a second marriage that added two teenage stepsons to her responsibilities, Mersereau recalls a time in her early 30s when the intensity of her work plus caring for her young daughter made her feel "the opposite of the superwoman complex — I wasn't doing a super job at anything!"

Mary Jo Greil
Manager, management services and planning
International Paper Corp.

Greil joined International Paper last summer, with responsibilities including both management services and technical training needs for 400 IS employees.

Her earlier jobs included managing an electronic document interchange project at Amca Corp., a $5 billion steel manufacturing firm.

Career demands have made it difficult for Greil to sustain a long-term personal relationship and prompted her to undertake a major health program earlier this year because of additional stress.

"This is stress I accepted, and at one point it was very exhilarating," she says. "Then I realized it was taking a major toll, which I don't know is necessarily worth it."

Nowadays, Greil concentrates on developing a more spiritual side of her personality to leaven her ambitions. "I start my day by going to church. It helps me to be a little more balanced," she says.

"I've found that I moved more into the education/administration area, but this is not where I want to be. I really don't have a career path worked out, but I know I am more adventuresome and creative and need a certain element of freedom of action."

Patricia Farwig
Vice president, telecommunications
Mellon Bank

Farwig had a college degree in zoology when she went to work for Woody Hayes, the Ohio State University football coach, in 1975. She pursued her MBA from Ohio State on a part-time basis until 1979.

Arriving at Mellon Bank in 1980, she sold corporate cash management services, then moved into product management, strategic planning and, eventually, telecommunications.

She says the long hours devoted to her career at Mellon Bank eventually contributed to her divorce. Today, she says, "I'm not juggling anything other than a personal relationship now, so I don't have to play superwoman."

Farwig explains that her " 'significant other' is extremely understanding and helpful, and that is absolutely a necessity. You can both be very high-powered in your careers, but it has to be a cooperative effort."

Joan Alvarez
Vice president
Swiss Re Services

Alvarez speaks with intense gratitude for the opportunities that enabled her to rise within the Switzerland-based reinsurance firm and the help her husband provides at home. After his injury 20 years ago in a serious auto accident, he took over all the responsibilities at home.

"He has assumed everything," she says, including the care of her 83-year-old mother. "I have been very lucky, and I am envied because of the support I have."

Alvarez admits that her standard work week has been 50 to 60 hours for at least 30 years. "I am very bad. I will take stuff home, and I travel on Sundays to be sure I'm at a Monday meeting, and I don't do recreation well at all!"

Karen Hughes
Chief of communications services
Federal Reserve Bank of New York

Hughes started at the bank 10 years ago as an MVS systems programmer on an IBM mainframe, expanding into data communications, automated operations and recovery facility work. A promotion put her into the bank's initial level of management.

However, a 15-year absence from the workplace to raise children meant "a lot of lost ground" toward her management goals, she notes. Today, she says, it is important to work extra hard to gain the recognition of corporate management.

Patricia Wallington
Vice president, Information management
Xerox Corp.

Wallington acknowledges that she works "incredible hours," averaging 16 hours per day.

"I'm a believer that you go through stages where different things are important at different times," she explains. "I grew up in a time when 'shoulds' were a part of the environment. But if I did everything people told me I should do, I would not be where I'm sitting today." •

Bank NA, ranked in the Top 20 of best-paid CIOs.

One reason women are sometimes offered lower salaries is that because of family and child-bearing duties, they are often perceived as lacking the mobility of male executives.

"If a client comes to a recruiter but is restricted in budget, he can basically get a better caliber woman" for the same dollar amount as would be spent for a male executive, Tolette explains. "Because of the apparent lack of mobility for women, there are some extremely talented ladies available at lower salaries."

Few role models

The problems facing women in computing extend even beyond the work force. Fewer and fewer U.S. students, including women, are electing to study computer science. A University of California at Irvine study found that in 1986, women earned only 12% of all computer doctorates. Little has changed since then, researchers say.

And the dwindling numbers of women academicians are increasingly being lured into private industry, which promises better hours that are often more conducive to family-building, reports an article in the November issue of *Communications*

UniPress has All the Right Unix Connections for PCs and Macs.

Now, PC and Mac users can run Unix® applications too, directly from the familiar mouse-and-icon desktop. No Unix commands needed.

PCs

XVision™ Run Unix X Windows and X applications from Microsoft Windows. New version for **Windows 3.0**. Price **$449.**

PC-Connect™ Use your Microsoft Windows™ PC as a Unix gateway. Click icons to run multiple Unix and DOS programs simultaneously. Supports dynamic data exchange (DDE) between DOS and Unix applications. SQL-Connect option brings Unix SQL database information into DOS applications. Priced from **$495.**

PC-Xview 16™ Turn your PC into an X-Window terminal. Price **$395.**

Macintosh™

MacNIX™
Use your Mac as a Unix gateway. Click icons on the Mac desktop for simultaneous access to both Macintosh and Unix applications, databases, electronic mail. Mac-style file transfer between systems makes it easy to do Macintosh editing and desktop publishing on Unix documents. Priced from **$800.**

eXodus™
Turn your Macintosh into an X Terminal. Price **$295.**

Network and Serial Connections

PC-TCP™
DOS Ethernet™ software for full TCP/IP DOS/Unix or DOS/DOS high speed communications. NFS option. Price **$400.**

MacLine™, PC Works™, UniHost™
Easy, inexpensive asynchronous connections for DOS PCs and Macs with Unix or VMS™. Customizable menus make the system easy to use. Priced from **$145.**

UniPress offers a full range of software and hardware for complete Unix connectivity solutions. Call us!

All product names are trademarks and registered trademarks of their respective companies.

software for UNIX

UniPress Software
800•222•0550
201•985•8000

Equal work, not equal pay

Women in IS staff jobs fare no better than female colleagues in other fields. Average pay: 70 cents for every dollar earned by males

	men	women
Systems analysts/computer scientists		
1989	$747	$620
1984	$623	$505
Programmers		
1989	$651	$541
1984	$510	$404
Data entry/keypunch		
1989	NA*	$300
1984	NA*	$258
Computer operations		
1989	$418	$321
1984	$373	$268

Figures are median weekly incomes for full-time wage and salary workers

* Not available: Fewer than 50,000 U.S. workers

Source: U.S. Department of Labor Women's Bureau
CW Chart: Marie Haines

of the ACM.

The long-term effects of such shortages concern many women IS managers. Kathy Hudson, vice president and director of corporate IS at Eastman Kodak Co., worries about the declining number of women receiving technical and engineering degrees.

"It was 26% in 1988, compared with 39% for men — and both numbers are in decline," she notes, adding, "I think we as a country have some extremely challenging times ahead in how we deal with that."

Further complicating matters is the fact that women who achieve high-level IS positions are often determined *not* to call attention to themselves as an oddity or exception to a rule. Several executive women who spoke with *Computerworld*, for example, were leery of speaking on the topic of women in IS and made a point of saying they did not want to be identified as feminists in any way.

Ellen M. Hancock, vice president and general manager of communications systems at IBM, for example, declined to be interviewed. "She doesn't do that sort of interview," her spokeswoman said.

Despite these less-than-heartening realities, many women in IS today are upbeat about their future prospects. "We are in a transition era as women," Hudson says. "The number of women at very senior levels is still quite small, though one keeps hoping that will change."

Many are optimistic

"I think you will find fewer women in the higher ranks now than you will in 10 years," predicts Diane Smigel, vice president of IS at John Hancock Mutual Life Insurance Co. in Boston. "There just haven't been that many women in the management pipeline before. But I think the IS profession is very well suited for women to do well and to progress through the ranks."

Unlike the entrenched business worlds of finance or industry, the relatively young MIS field opened up "a more level playing field" for women, notes Mike Hammer, IS consultant and president of Hammer & Co. in Cambridge, Mass.

"Compared to other functions in corporate environments, systems has been relatively hospitable to women," Hammer says. "One reason is that IS as a whole is a new function, as opposed to older ones with accumulated bias against women and a pipeline full of men. Women didn't have to elbow their way past a lot of others."

Certain fields, such as insurance, telecommunications and law, are widely believed to be more hospitable to women IS executives than banking and finance.

"Years ago, banks were paying much lower salaries, so they attracted women and minorities," explains Mary Kay Hamm, a partner at Romac & Associates in suburban Philadelphia. "Now, those same people are moving into management positions."

Smigel says she believes the midmanagement talent pool is brimming with women preparing to assume a more equitable share of the top jobs by the year 2000.

Small galaxy of stars

Despite several obstacles, IS systems management is slowly developing its own roster of high-profile female executives, such as Hudson, Bond, Smigel, Patricia Wallington, vice president and CIO at Xerox Corp.'s U.S. Marketing Group, and Carlene Ellis, vice president of corporate administration at Intel Corp.

Women who do arrive at the uppermost reaches of the profession are likely to have backgrounds emphasizing business training over technical expertise.

Devi Huggins, for example, is a technical officer in securities clearance at Manufacturers Hanover Trust Co. She is working on her MBA by taking night classes at New York University.

"I'm aiming for corporate management," explains Huggins, president of the New York chapter of the Association for Women in Computing. "This is something my employer encouraged me to do."

Mary Jo Greil, who manages the Management Services and Planning Division at International Paper Corp. in Memphis, also underlines the need for IS professionals to flesh out their business backgrounds to "gain credibility" with top company managers. She holds a doctorate in education with an MIS speciality, as well as an executive master's in telecommunications and IS management.

Women in IS

The number of women entering computing swelled during the last five years of the 1980s, but percentages remained the same

	Total	Women	
Systems analysts/computer scientists			
1984 total:	310,000	93,000 women (30.7%)	UP 84,920
1989 total:	566,000	177,920 women (32.4%)	
Programmers			
1984 total:	507,000	177,450 women (35.4%)	UP 18,900
1989 total:	561,000	196,350 women (35.2%)	
Data entry/keypunch			
1984 total:	351,000	319,410 women (91.3%)	UP 40,770
1989 total:	414,000	360,180 women (87.8%)	
Computer operations			
1984 total:	713,000	456,320 women (64.7%)	UP 100,480
1989 total:	870,000	556,800 women (64.2%)	

Source: U.S. Department of Labor Women's Bureau
CW Chart: Marie Haines

The next big step

Moving from middle and upper management into company leadership is still an elusive goal for many executive-level women, however.

"The real challenge is to move higher. You have to work hard to stand out," says Karen Hughes, chief of communications services at Federal Reserve Bank in New York. "Many women, including myself, have not really been raised to be assertive, to push your way forward. You have to learn how to do that."

One way to get to the top fast is to get out of the corporate rat race, says Marguerite Zientara, author of *Women, Technology and Power* and editor of *Boston Computer Currents.* "The Glass Ceiling *does* exist, and the best way to get around it is to go off and do it yourself. Start at the top by starting your own company."

She cites personal computer luminaries such as computer newsletter editor Esther Dyson and Janelle Bedke, cofounder of Software Publishing Corp., as proof of the opportunities for women, especially in the PC industry.

Others are more sober about the immediate prospects for women in IS management. "I'm not expecting a miracle," Hamm says. "Organizations are getting flatter all the time, and a lot of middle managers are being let go."

Another bad sign, she says, is the growing popularity of a practice she calls "swabbing out." In this, experienced workers, including many women, are laid off and soon replaced by less costly, less experienced workers.

Even so, Hudson and others say they are optimistic about the future for women in IS. Today's issues may not even be relevant, she adds.

"Forget the male vs. female stuff," Hudson says. "In the future, we'll be dealing with a flatter, more technologically dependent corporation. Careers will be more like meandering down a stream than climbing the rungs of a ladder."

Next week: Strategies for advancement. ●

What's hot in New Orleans besides Cajun cookin'? Mardi Gras, Jazz, and SUGI 16

SUGI 16
NEW ORLEANS

SAS® Users Group International
Sixteenth Annual Conference
February 17-20, 1991
New Orleans Hilton Riverside
and Towers
New Orleans, Louisiana
Martin J. Rosenberg,
MAJARO InfoSystems, Inc.,
Conference Chair

Join more than 4,000 SAS software users as they gather to exchange ideas and innovations at the 16th annual SUGI conference.

Attend your choice of more than 300 presentations on Applications Development; Computer Performance Evaluation; Database Management Facilities; Econometrics, Operations Research, and Quality Control; Graphics; Host Systems and the C Language; Information Systems; Statistics and Statistical Graphics; and Training and User Support Services.

Other conference events include tutorials, demonstrations, roundtable discussions, a problem-solving booth, hands-on computer workshops, and Consultants' Registry. Don't miss the excitement of this annual tradition.

To register, contact:
SUGI 16 Coordinator
SAS Institute Inc.
SAS Campus Drive ☐ Cary, NC 27513
Telephone 919-677-8000

SAS is a registered trademark of SAS Institute Inc., Cary, NC, USA.
Copyright © 1990 by SAS Institute Inc.

BLAST®

Very fast, very reliable software that connects everything!

If your communications software doesn't stack up, call
1-800-24-BLAST.

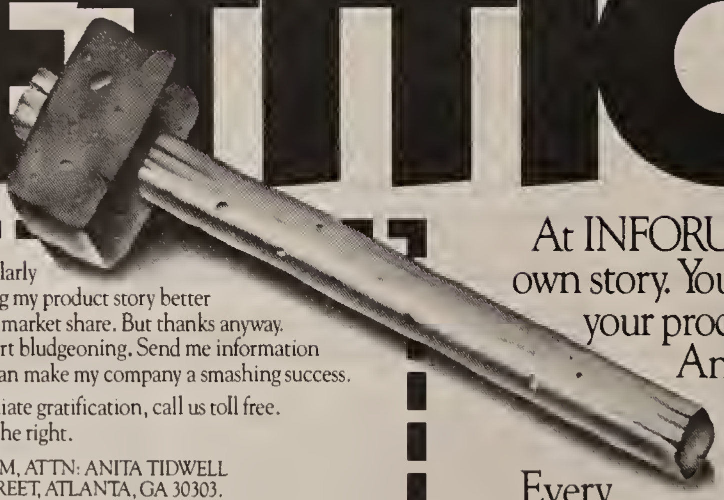
or write:
Communications Research Group
5615 Corporate Boulevard
Baton Rouge, Louisiana, U.S.A. 70808
A U.S. Robotics Company

INTRODUCING A VERY CIVILIZED WAY TO BLUDGEON YOUR COMPETITION.

Beat the competition—before they beat you. That's the challenge in the technology business. And only companies that arm themselves for the fight will be around to compete tomorrow.

To survive, you've got to do more than just build a good product. You've got to get it into the hands of real buyers, and tell your product story better than the competition.

Now, in Atlanta, there's a place where you can do both. INFORUM. A powerful direct sales environment that puts you face-to-face with qualified buyers, at the moment of their buying decision.



☐ I'm not particularly interested in telling my product story better —or increasing my market share. But thanks anyway.

☐ I'm ready to start bludgeoning. Send me information on the tools that can make my company a smashing success.

If you want immediate gratification, call us toll free. The number's on the right.

MAIL TO: INFORUM, ATTN: ANITA TIDWELL
250 WILLIAMS STREET, ATLANTA, GA 30303.

Name
Title Company
Address
City State Zip
Phone

INFORUM

At INFORUM you tell your own story. You demonstrate your product's advantages. And you control the sales process. Completely. Every single business day of the year. It's no wonder INFORUM is rapidly becoming the center stage for technology sales and marketing.

Certainly there are other tools you could use to bludgeon your competitors. But in comparison to INFORUM, they all seem rather primitive.

1-800-343-5045

SHOW THE WORLD
WHAT YOU'VE GOT.

COMPUTER INDUSTRY

NATIONAL BRIEFS

Data General in command

Data General Corp. began shipping its reduced instruction set computing-based Aviion computers last week to the Water Resources Division of the **U.S. Geological Survey**, notwithstanding a reportedly pending congressional investigation into the awarding of the $127 million, seven-year federal contract. The struggling computer maker has thus far legally prevailed against a losing bidder's attempts to have the U.S. Court of Appeals overturn the lucrative deal.

Another bumper crop from the farmer of the Dell

Widely reported softening in the personal computer market apparently bypassed the Austin, Texas, door of **Dell Computer Corp.** Crediting strong gains both at home and abroad, Dell reported a third-quarter net income increase of 700%, to $7 million on revenue of $137 million, which was a 43% increase over sales posted for last year's corresponding quarter. The company did, however, inject a note of caution into an otherwise crowing prepared statement: Noting that margin improvements were shaved by a recent spate of price cuts, the statement said that pricing pressures in the personal computer market show no sign of abating.

More briefs on page 99

Manufacturing alliance takes shape

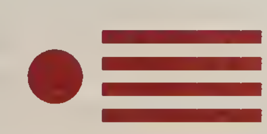
BY GARY H. ANTHES
CW STAFF

TOKYO — The U.S., Japan and Europe have reached an agreement in principle to form an ambitious partnership in advanced manufacturing technologies.

In two days of meetings held late last month, delegations from the three regions agreed to set aside their differences and proceed to establish one or more interregional consortiums of manufacturing companies and universities.

No firm plan detailing funding, organization or specific research topics has yet been drafted, and the partnership is far from a done deal, said Mark S. Lieberman, acting assistant technology secretary at the U.S. Department of Commerce and leader of the U.S. delegation.

"But I am very encouraged that we will come up with a mutually acceptable program," Lieberman said. He added that the next step is to take the concepts agreed on to U.S. industry for approval. If that goes well, another three-way round of negotiations will be held in Washington, D.C.



"U.S. industry sees this as a wake-up call for developing its own manufacturing agenda," Lieberman said.

Zeroing in

U.S. industry has proposed that the partnership focus on international standards for advanced manufacturing and information technology, manufacturing systems integration, quality engineering and process technologies.

The so-called Intelligent Manufacturing Systems project sparked controversy when it was originally proposed by Japan.

Japan's Ministry of International Trade and Industry (MITI) proposed a 10-year, $1 billion collaboration, with MITI putting up $400 million and Japanese, U.S. and European industry each providing $200 million.

Japan explained the lopsided funding as a response to charges that Japanese industry gets more than it gives in the international high-technology arena.

However, at a meeting in May, U.S. and European officials balked at the proposal, saying that unequal funding implied unequal control. An updated proposal from Japan in August suggested that each region provide one-third of the funding.

U.S. industry and the U.S. Department of Commerce supported the concept of international collaboration but worried that the proposal appeared to be going after superior U.S. know-how in software, artificial intelligence and systems integration technology without a fair return of applied manufacturing technology, in which Japan excels.

"No, I'm not at all surprised an agreement was reached," said Masahiro Meshii, a professor in the materials science and engineering department at Northwestern University.

"The stumbling block has been in our minds," he said. "The Commerce Department has been concerned about Japan stealing our brains, our ideas. That could happen, but it depends on how we set it up."

According to Meshii, earlier missteps on the part of Japan resulted because the idea for Intelligent Manufacturing Systems was conceived and led by politically naive Japanese university professors. "Things like this are not well orchestrated in Japan," he said.

Vendor and users unite to help children find homes

BY SALLY CUSACK
CW STAFF

DENVER — Combine a couple of thousand children waiting to be adopted, a dedicated computer software user group, minicomputer vendor Prime Computer, Inc. and an energetic director, and what do you get?

You get the Rocky Mountain Adoption Exchange, a resource center for hundreds of adoption agencies networked throughout the country.

It all started in March 1983, when Adoption Exchange Executive Director Dixie van de Flier Davis issued a plea on a weekly installment of the popular network television segment "Wednesday's Child" saying that the Rocky Mountain Adoption Exchange was in dire need of office space and computer assistance. The service was then working with a post office box and a handful of volunteers.

Peggy A. Long, vice president of Fitzgerald and Long, a Denver-based software and systems support firm, was the first to respond. The company provides services exclusively to the Prime Information database user community, and Long said she felt there must be a way to tap into the Colorado Prime Users Group for help.

Davis remembers the event clearly: "Peggy Long called me and said, 'Let me talk to you about your computer needs.' And we went from there." They went, in fact, to Prime; inspired by its users, the firm donated the needed computer equipment.

Continued on page 98

Florinda Rmae

Adoption *of this child became a reality, thanks to Prime*

INFOMART FROM JANUARY TO DECEMBER.

INFOMART is where you can see and evaluate the latest in information and communications technology. It's also home to a year-round schedule of conferences and seminars designed to keep you up to date on the latest technology.

Call today to get your free INFOMART schedule of events. It's the easy way to make your visit to INFOMART even more productive.

Call today to get your free schedule of events. 1-800-232-1022

INFOMART®
Where the leaders in automation share their knowledge with you.

INFOMART. 1950 Stemmons Freeway, Dallas, Texas 75207 INFOMART is a registered servicemark of IFM partnership.

Children

CONTINUED FROM PAGE 97

Long proceeded to organize the reponse within the Prime Information community, Davis said, and initially arranged for free computer time-sharing and organized a data-entry committee consisting of Prime Information users.

The group entered data and sent literature to interested parties, wrote entry screens and created databases within Prime Information to coordinate donor activities and mailing lists and maintain pertinent data on both the children and the prospective parents.

"We started out with computerized matching," Davis said, "and things just took off from there."

This type of technical support enabled the Adoption Exchange to blossom and establish fund-raisers on several regional television stations, Davis said. "We do fund-raisers in three states every spring," she said, "and the Prime users help us to put together the response."

The Adoption Exchange exists to find families for hard-to-place children. Usually, this means older children and adolescents as well as children with physical handicaps, multiracial heritages and learning disabilities, Davis said.

"The average child waiting to be adopted is a 12-year-old boy who has spent four years in and out of foster care before being eligible for adoption," Davis explained.

The center relies on media, mass mailings and an extensive database in an effort to match the child with adoptive parents. According to Davis, 97% of the adoptions in the U.S. are successful, and in fiscal year 1990, the Adoption Exchange matched 187 children with families. "It was our best year ever," she said.

Davis added that the computer equipment and support has allowed the agency to be more efficient and to spend less time on manual records management and more time with clients.

Things have changed since the early '80s, however, and as the Adoption Exchange grew over the years, extensive word processing and database inquiry functions outpaced the dial-up port on which the group originally relied. The user group appealed to Prime for a solution to the problem. Prime initially responded by donating a Prime 2250 minicomputer to the organization, and terminals and peripherals were contributed by a variety of other companies. The Adoption Exchange continued to grow, and Prime eventually added a 2755 machine, 25 PT250 terminals, a laser printer and even kicked in support from its local branch office.

"Prime gives us reduced rates on our maintenance and treats us like a regular customer," Davis said. Prime employees, she added, even get involved with the center's data management committees, helping out with communications and other technical issues.

"Prime is happy to continue supplying the exchange with equipment that speeds up the process of matching adopting families with children in need," said Paul D. LaBelle, a spokesman for Prime.

Working for the Adoption Exchange is an ongoing commitment. The center's mailing list now approaches 18,000 entries, and, according to Davis, the programming is still done entirely by the Prime user group volunteers.

"By this time next year, over 1,000 children will have been placed since Peggy Long contacted us in 1983," Davis said.

Corporate contributions

Industry giants such as IBM and Eastman Kodak Co. have long been making substantial financial donations to supplement the arts, sciences and education.

Fortunately, the trend continues. AT&T recently donated computer equipment valued at $1.2 million to the University of Miami's medical school to be used for research of certain medical conditions and diseases — particularly high-risk pregnancies and acquired immune deficiency syndrome.

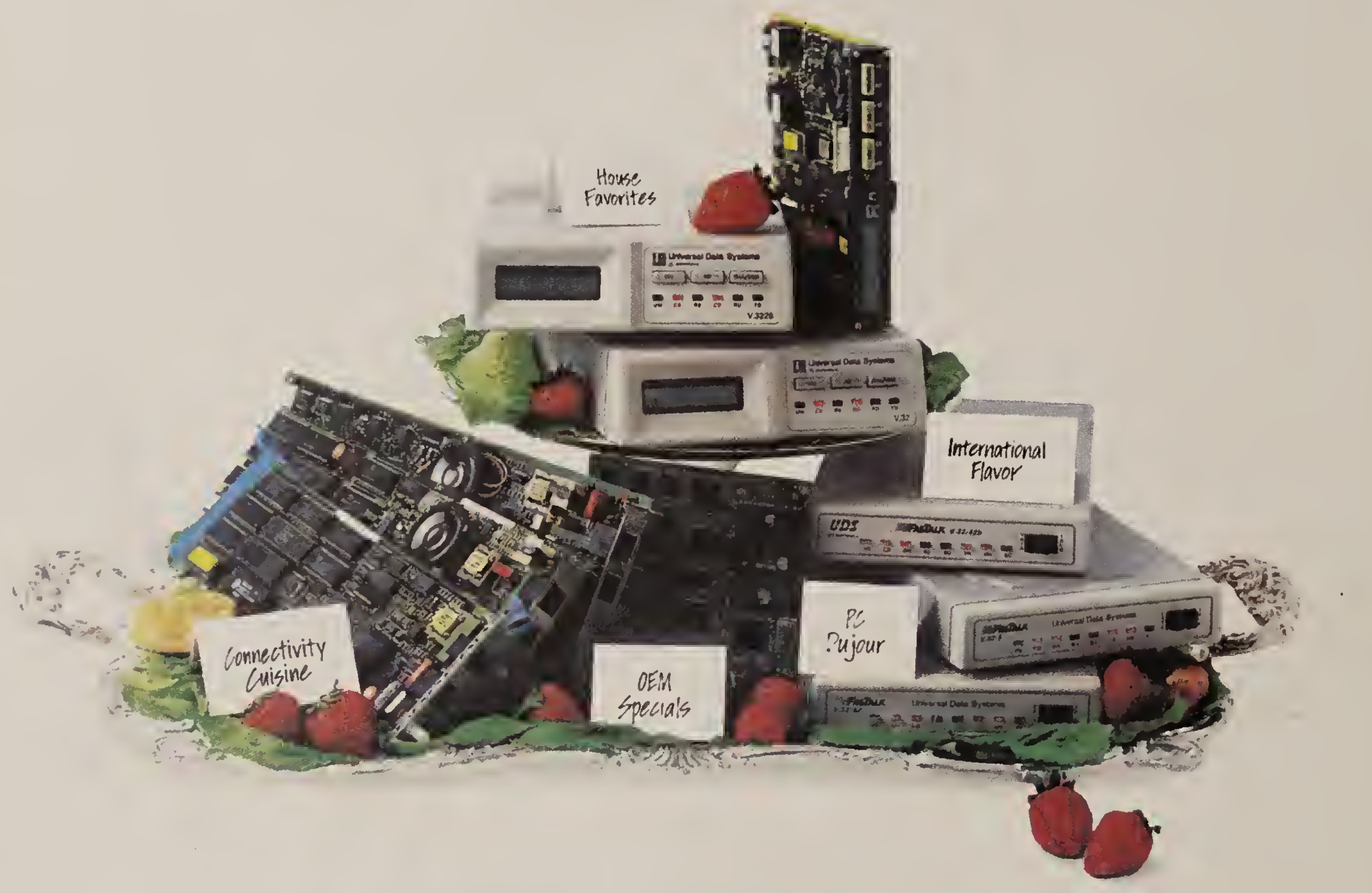
The contribution includes an AT&T Unix System V-based network computing platform and several AT&T midrange computers, as well as training and technical support.

Another vendor caught in the act of Good Samaritanism is SAS Institute, Inc. in Cary, N.C. SAS donated PC SAS Version 6.03, a personal computer version of its SAS information management package to the Women's Center in Raleigh, N.C., and has provided training and file conversion services for the center.

The Women's Center, a multiservice counseling and resource center for women, offers peer counseling, support groups, workshops and referral services. The SAS system generates quarterly statistics of a demographic nature, such as number of women serviced, age, income and location. The data is then forwarded to agencies that help to fund the center, such as the United Way and the city of Raleigh.

SALLY CUSACK

V.32 Smorgasbord



UDS offers more choices, more features than any other modem builder

UDS, acknowledged by leading trade magazines and independent research organizations as the world's premier supplier of V.32 modems, offers more variations on the V.32 theme than any other manufacturer.

Every modem in the UDS V.32 family has the dial-up, full-duplex 9600 bps and associated fallback capabilities mandated by the CCITT recommendation. Beyond basic V.32 conformity lies a myriad of features and options. Among the user options available are:

PACKAGING — UDS V.32s may be ordered as board-level IBM plug-ins, in standalone packages or as central site rack-mountable cards.

THROUGHPUT — Selected models offer MNP® levels 4 and 5 for error control and data compression; others, in compliance with CCITT V.42 *bis*, offer MNP or LAP-M compression throughput rates up to 38,400 bps.

CONNECTIVITY — Sync-Up™ board-level versions of V.32s are available for various combinations of BSC, SNA and OS/2 host-to-remote communication for EDI, X.25, BSC, SNA and LU6.2 applications.

PC APPLICATIONS — V.32s are available in the FasTalk® configuration, designed especially for PC use.

INTERNATIONAL ACCEPTABILITY— Several versions of the UDS V.32 have already been qualified to non-U.S. operating standards, assuring their acceptability in multi-national networks.

Features and value make UDS the favorite choice for V.32s. For a look at the whole menu, contact UDS, 5000 Bradford Drive, Huntsville, AL 35805-1993. Telephone 205/430-8000; FAX 205/430-8926.

UDS

MOTOROLA

Created by Devnerhall Inc. Winter Park, Florida   MNP is a trademark of Microcom, Inc. OS/2 is a trademark of International Business Machines. Sync-Up and FasTalk are trademarks of UDS

COMMENTARY

J.A. Savage

Let others do the grunt work

No blueprint exists for the seemingly incongruous marketing plan that Sun Microsystems has embarked on. It's not just anti-IBM marketing gospel, it's anti-business school. Don't get me wrong, though — just because it wasn't hatched in B-school doesn't mean that it won't work.

The plan has the potential for two extremes: It will either send Sun screaming down dank, bankrupt canyons pursued by its own motherless clone progeny, or it will allow the firm to ride high on the tide of technical innovation provided by other computer companies — at no cost to Sun.

Officially, Sun's strategy goes like this: "Open systems, licensing, partnerships and the promotion of next-generation technologies are some of the ways Sun is changing the rules to achieve strategic intent . . . Since healthy competition stimulates innovation and gives customers value, the solution is to open up markets to more vendors . . . Competing through collaboration . . . encourages parallel innovation, as various companies concurrently design their own version of this technology . . . Licensing technology also helps establish new standards, reducing the risk for companies by ensuring them a broad market, and for customers, it reduces risk by making sure they aren't captives of a single vendor."

In real-life terms, here's what it means: Other RISC companies — with one minor exception, Hewlett-Packard, but I'll get to that another time — take it upon themselves to do all their own research and development. Mips, Intel and Motorola have their own engineers developing the next greatest, fastest RISC chip. They also have their own engineers trying to surmount all the problems of the next greatest, fastest RISC chip.

Then those companies license the silicon mask to chip makers, which tailor the chips to their own specifications. There are second, third and fourth sources, but they are all the same.

Not Sun. Once Sun had the basic architecture for its Sparc RISC processor, it invited everyone to the party. And all the guests were — and still are — dire foes in the marketplace. Still, they sip their cocktails and make nice with the binary compatibility specifications necessary for Sparc.

Chip makers such as Texas Instruments, LSI Logic and Cypress Semiconductor — as Sun licensees — now have to send their own engineers back to R&D to come up with the next greatest, fastest Sparc processor. Those companies — and there are lots more than the three mentioned here — are spending their own bucks to improve Sparc. Sun doesn't have to do a thing except wait for the best chip to come out and then put it into its own systems. Its R&D goes elsewhere — into value added — while the licensees do all the grunt work.

HP licenses its Precision Architecture RISC technology in much the same way, but it is limited to only two licensees at this point, and there is little competition between them. Sounds good so far for Sun's strategy, but even the company knows the gruesome potential of its own business plan.

All those licensees can build their own computers around their own Sparc chips. They could be cheaper and more powerful than Sun's own computers. Users could prefer these clones the way they buy IBM PC clones at the low end.

That's the rub. "No, I don't love these guys; I want to beat them," Ed Zander, Sun's top marketing man, said. But without them, Sparc wouldn't be as well developed or as popular.

Comdex/Fall '90 offered the first glimpse of the fruits of Sun's strategy. Sun's CEO, Scott McNealy, didn't even know how many Sparc compatibles were going to appear. His first public estimate was 30, and that was revised down to 10 early last month. Eight actually appeared. Sun is taking an interesting risk. The company will see its offspring grow into challenging adolescents. Will they offer the advantages to users that Sun does and reap the benefits Sun now enjoys? We'll see.

"If we do nothing more than invent clones that take the market, then that's the last chapter for Sun," Zander said.

Savage is a *Computerworld* West Coast senior correspondent.

NATIONAL

BRIEFS

Ascii and you shall be given

Last year, Menlo Park, Calif.-based database maker **Informix Corp.** bought a 10% stake in Tokyo-based **Ascii Information Systems**, a subsidiary of Japan's **Ascii Corp.** Last week, Ascii, which is actively bearing the open systems banner in Japan, agreed to purchase 5% of Informix for approximately $6.7 million. The firms are resolved to intensify their relationship only within limits; last week's agreement includes a ceiling on the number of Informix shares Ascii can acquire.

EIS

If You're Thinking About It...

Hong Kong telecom plan falters

BY LAURA M. JANNEY
and KENNETH WONG
IDG NEWS SERVICE

HONG KONG — Hong Kong lost more than the potential for cable television last month when Hong Kong Cable Communications (HKCC) withdrew from the well-publicized cable TV project. The bigger issue may be the future of telecommunications competition in Hong Kong.

In discussions last year, Miles Davenport, an executive at HKCC consortium member US West, said Integrated Services Digital Network switching was as important to HKCC as its cable TV plans. At the time, Davenport said he was startled by the many people who said they believed the company was primarily interested in cable TV.

During those discussions, Davenport called for the dismantling of the domestic voice telecommunications monopoly, saying that HKCC was well prepared to take advantage of any relaxation of the monopoly.

But in disbanding its cable TV project, the consortium also appears to have given up its plans for voice telecommunications. In fact, it appears that the group has called a stop to all further business activity.

During attempts to contact HKCC late last month, the firm refused telephone calls, explaining that company executives would no longer be in the offices and that the phone lines were going to be disconnected. Davenport has since been posted back to the U.S., and other US West executives in Hong Kong were unavailable for comment.

However, Davenport's belief in a second, competing telecommunications network is apparently shared by others in the industry. Lawrence Garfinkel, AT&T's vice president for government affairs, said last month, before HKCC's announcement, that Hong Kong should go ahead with its development of a second telecommunications network. Doing so would generate competitive pressure that would benefit Hong Kong's business community, he said.

"Introduction of a second carrier such as the one proposed by the [HKCC] group can stimulate competitive pressure in a monopoly environment," Garfinkel told a meeting of the Hong Kong Management Association.

> "THE HONG Kong government has announced the first step to stimulate competition by developing an alternative carrier."
>
> LAWRENCE GARFINKEL
> AT&T

AT&T was one of the parties interested in the second carrier project, but it did not succeed in mounting a winning proposal, Garfinkel said. He observed that introducing a second network is the first step toward inducing competition.

"According to my understanding, the Hong Kong government has announced the first step to stimulate competition by developing an alternative carrier," he said. Hong Kong Telephone's present franchise for domestic telecommunications ends in 1995.

Rumors of the withdrawal had been circulating since local investment holding company Hutchison Whampoa Ltd. announced its intention to develop satellite master antenna TV early this summer. The proposal was given the go-ahead by the Hong Kong government in late October.

The government has indicated that future negotiations will likely divide the issues of cable TV and voice telecommunications.

Janney and Wong write for Computerworld Hong Kong, *an IDG publication.*

MultiMux™ Statistical Multiplexers

Expect substantial savings in your data communication costs when you replace your dial-up lines with a pair of MultiMux statistical multiplexers and one or two leased lines. You'll simplify your asynch communications while adding new levels of network security.

And save on equipment cost, too. Take advantage of MultiMux flexibility in linking remote user groups to LANs, without establishing expensive separate LAN systems for each distant location.

All the features and support you require. Multi-Tech's statistical multiplexers are available in 4 to 32 channel models with 9600 or 14,400 bps internal modems. Simple to install and easy to use. Plus, every MultiMux has a built-in command modem which links your MultiMux to Multi-Tech's Support Center where remote diagnostics can be performed should problems occur. And there's a toll-free helpline to get assistance whenever you need it.

Multi-Tech Systems. For twenty years, your expert data communications resource for modems, multiplexers, LAN systems and 3270 emulators.

MultiTech® Systems
The right answer every time

Multi-Tech Systems, Inc.
2205 Woodale Drive
Mounds View, Minnesota 55112 U.S.A.
(612) 785-3500 (800) 328-9717
U.S. FAX (612) 785-9874
International Telex 4998372 MLTTC
International FAX (612) 331-3180

AMD lays off 200 employees

BY MAURA J. HARRINGTON
CW STAFF

SUNNYVALE, Calif. — Like a high-flying kite caught unexpectedly in a thunderstorm, Advanced Micro Devices, Inc. (AMD) last week laid off 200 of its 12,000-plus worldwide staff.

The layoff came only weeks after AMD won significant legal victories in its ongoing battle with Intel Corp. over the right to use key chip technology [CW, Oct. 15].

AMD further confirmed that the layoffs, due to be completed by the end of the month, will be followed by at least one more round of work-force cuts. Sources speculated that the combined layoffs will trim up to 4.2% of the company's worldwide work force and practically eliminate its U.S. marketing department, which analysts claim is much needed to successfully market AMD's upcoming AM386 microprocessor, an Intel clone chip. AMD declined to comment on how deep the combined layoffs will cut.

The first round of cuts were mostly at the sales and administrative levels, according to an AMD spokesman, who called them a necessity to help offset the firm's most recent quarterly losses. AMD reported a net loss of $17.8 million on revenue of $254.2 million in worldwide sales for its third quarter ended Sept. 30; the revenue figure marked a 7.5% drop from sales posted in the comparable quarter last year.

The next wave of layoffs, which is expected to affect as many as 300 people shortly after the new year, will cut deeper into the company and on a higher level, including upper-level marketing and sales executives, the source said.

AMD is blaming the first wave of layoffs on lagging CMOS chip sales, a lower than expected plant productivity rate and unusually high capital spending, the spokesman said.

"Capital spending in 1990 will have totaled $300 million, of which nearly $200 million is being spent on our submicron facility in Sunnyvale," which is due for completion sometime next year, the spokesman said.

AMD is not the only Silicon Valley semiconductor firm experiencing layoffs. Applied Materials, Inc., in Santa Clara, Calif., slashed between 250 and 350 employees from its staff last week and reduced executives' salaries by 10%, the company said.

Mail-order firm losing cash, CEO

BY MICHAEL FITZGERALD
CW STAFF

EDEN PRAIRIE, Minn. — Mail-order personal computer vendor Northgate Computer Systems, Inc. announced last week that it was not meeting the provisions of its bank loans and had replaced its chief executive officer, indicating that the company was in trouble.

A relative newcomer to the PC industry, Northgate, which was founded in 1968 but switched from novelty products to PCs only three years ago, has followed a strategy of providing low prices, high-quality machines and excellent service to make it in the brutal mail-order business.

While Northgate still projects $240 million in sales this year — more than double its 1989 sales of $110 million — it is almost out of cash, according to documents recently filed with the Securities and Exchange Commission, in which the company states that it is not meeting some provisions of its bank loans. The same documents noted the resignation of its CEO, Lawrence Greenberg — even as the December issue of *Minnesota Ventures* magazine featured a cover article on Greenberg's skillful management of growth at Northgate. Greenberg, still a board member, was replaced by Gary Held, former president of the retail chain Connecting Point of America, Inc.

The company's cash problems come after a $1.9 million third-quarter loss, and despite almost $10 million in financing garnered over the last two quarters. In July, after unsuccessful attempts to go public, Northgate took a rarely used alternative and cut a "junk stock" deal with Ante Corp. II, a Minneapolis-based fund, selling Ante a 13% stake for $4.4 million and thus becoming a publicly traded firm without making an initial public offering.

In addition, Northgate's bankers reportedly increased the firm's revolving line of credit from $10 million to $15 million in the last quarter. Northgate officials did not return *Computerworld*'s calls.

Northgate has been implementing a program to cut costs, laying off 150 of its 870 employees since the beginning of September. Last week, Held cut his salary and those of the other two senior managers by 50% and said expenses had been reduced by $1 million per month.

Nevertheless, analysts appeared loath to count Northgate out last week. The recent news is "definitely not a good sign, but there's nothing we can see from here to make us say [they're gone]," said Dan Ness Jr., PC analyst at Computer Intelligence in La Jolla, Calif.

EIS II

Think Twice.

It's estimated that more than half of today's Executive Information Systems fail.* So if you're thinking about installing a traditional EIS, think twice.

EIS II is the new generation of Executive Information Systems. It's more than just an electronic "slide show". It's true analysis and issue management. For executives, their staffs, and managers throughout your organization.

Only Express/EIS® from Information Resources gives you the power of EIS II today. On mainframe, LAN or PC. With full data integrity, end-user flexibility and worldwide support.

If you're thinking about EIS, think EIS II.

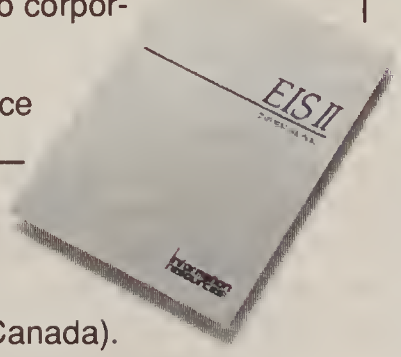
Express/EIS Delivers:
- Ease of use for executives, staff and management
- Smooth integration of tracking, analysis and issue response
- Intelligent exception reporting and drill-down
- Dynamic links to corporate data
- Low maintenance costs

For a free EIS II Information Kit, call **617-890-8717** (**416-221-2100** in Canada).

information resources inc

*David W. DeLong, co-author of "Executive Support Systems: The Emergence of Top Management Computer Use."

©1990 Express/EIS is a registered trademark of Information Resources, Inc.



INTERNATIONAL

BRIEFS

Whither the House of Cables?

Thatcher's out, Major's in — now, on to the really hard decisions for the **UK Parliament**, which has on its agenda for this session the question of whether to implement a cable network aimed at wiring Whitehall into the computer era. The decision will be made in light of a recent report on computer services released by the UK Commons Services Committee, which urged, in part: "The House cannot continue to adopt the wholly amateur approach to the use of new technologies," in contrast to the strides made by parliaments of other countries.

Light at the end of the Chunnel

Despite the immediate recession, long-term growth prospects for the European computer industry through the 1990s are still bright, according to a study released by UK-based **Ovum Ltd.** By the year 2000, Ovum forecasts overall industry sales at three times what they are today in real terms. The company said it also believes that the industry will return to real growth averaging some 11% annually.

Unification privatization

Telekom, the telephone business of the **German Bundespost**, is reportedly being considered for partial privatization. The move is intended both to raise money to help cover the cost of German unity and to speed the recabling of what was formerly East Germany. A study group set up by the Bonn cabinet is currently investigating alternatives for the infusion of private capital into infrastructure projects.

Brand-name loyalty oath

The gospel according to Madison Avenue is finding converts in **Hong Kong**, where computer manufacturers are fast becoming aware of the need to develop brand-name recognition. Spurred by the increasing commoditization of personal computers, peripherals and even facsimile machines — and the consequent decrease in OEM margins — the **Hong Kong Trade Development Council** is holding a conference on brand names, and the chairmen of leading high-tech firms such as Informtech and Video Technology have plans to develop their own brand names.

EDI going Dutch

With about 30 electronic data interchange (EDI) networks currently operational and a similar number in test phase and almost ready to go, **The Netherlands** is becoming a hotbed of EDI development. Some 1,400 institutions now use Dutch EDI; the figure climbs to the 1,800 to 2,300 range when hybrid videotex/EDI systems are counted. The Dutch Ministry of Economic Affairs is actively stimulating new projects, because EDI is seen as key to the country's future economic development. So said Walter Zegveld, director of a Netherlands-based research center, in a report given before the 1,000 attendees who flocked to the country's first EDI national conference, held recently in The Hague.

EXECUTIVE CORNER

Alpha COO steps down

Alpha Microsystems announced the resignation of its president and chief operating officer, **John S. Cain,** last month. Cain, who cited personal reasons, leaves at the end of a year that saw his company log 11% growth, complete two major acquisitions and expand its multiuser systems and software sales into the worldwide market. Replacing Cain is NCR Corp. veteran and marketing consultant **Clarke Reynolds,** who had been serving as vice chairman of Alpha Microsystems and will continue to hold that office.

Storage Technology Corp. expanded its international marketing savvy with the advent of 30-year worldwide marketing veteran **Geoffroy de Belloy** as senior vice president reporting on special assignment to Storage Tek president and Chief Executive Officer **Ryal Poppa.** De Belloy's experience spans systems companies and continents: For the past eight years, he has served at **Wang Laboratories, Inc.** in Europe, most recently as head of distribution for Europe, Africa and the Middle East.

Retix promoted its president, **Steve Frankel,** to president and CEO late last month, replacing **Andy De Mari** as CEO. De Mari, founder of the Santa Monica, Calif.-based Open Systems Interconnect products manufacturer, will retain his position as chairman of the board. Frankel joined Retix as president and COO two years ago. He served as president of Emulex Corp. prior to joining at Retix.

Call regarding our free installation offer by December 31, 1990.*

Is your customer support forcing you to go to extremes?

Now there's an alternative to long-term service contracts, which your customers may not want, and support service, which *you* cannot afford to give away. The solution is AT&T *MultiQuest*® 900 Service and it's an innovative support option that allows your customers to pay only for service as they need it.

AT&T *MultiQuest* 900 Service is a completely interactive 900 service designed to serve you on a national or regional basis. By using AT&T *MultiQuest* 900 Service, you can offer customers 24-hour-a-day access to your technical support via a designated 900 number. Your customers simply call the number whenever they need technical assistance from your support staff or access to interactive databases.

With AT&T *MultiQuest* 900 Service, you can offer more comprehensive support than ever to your customers. And because you determine the charge for the information in advance, it's also an excellent method to generate new revenue.

AT&T makes it easy by handling all of the billing and collections and forwarding the net proceeds to you. And by using AT&T *MultiQuest* 900 Service, you're maximizing revenue opportunities because the AT&T Network can deliver the highest percentage of potential callers to your 900 number of any long distance network.

So think about AT&T *MultiQuest* 900 Service. Now you don't have to get caught between the rock of service contracts and the hard place of giving customer support away.

Innovation. Another AT&T advantage.

Through December 31, 1990, AT&T will waive the installation charges on AT&T *MultiQuest* 900 Service. For full details on how this offer* applies to your business, contact your AT&T Account Executive or call 1 800 243-0900.

AT&T
The right choice.

©1990 AT&T
*Some restrictions may apply. Pending FCC approval.

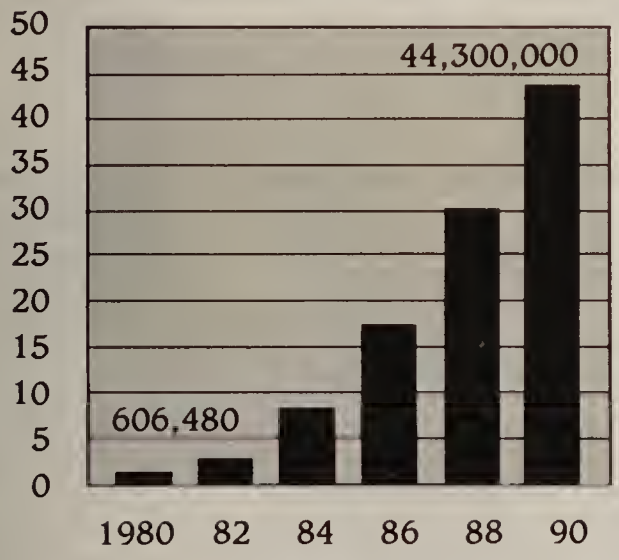
If you recruit computer professionals, we have their numbers.

We've probably spent more money researching this market than any company in America. And what we've learned can help you.

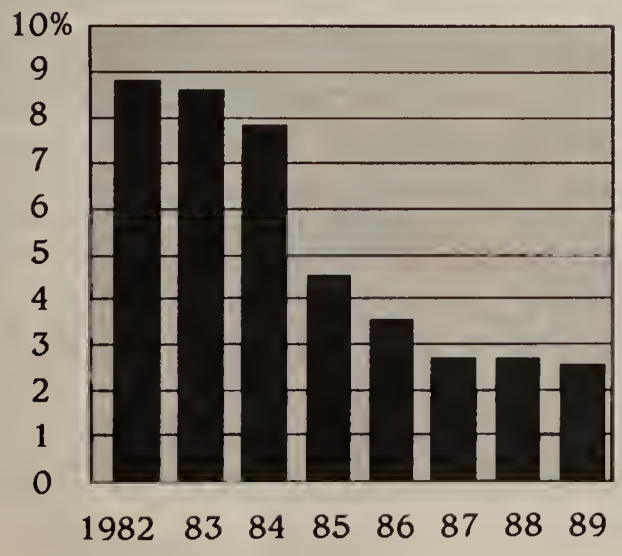
Number of computers up 7,300% in 10 years.

At this pace, how will you meet the demand for staff in the future? One source is America's campuses. But with college freshmen interest in computer careers dropping more than two-thirds since 1982, you'll need to find other sources. Call us. We'll tell you about them.

More computers are demanding more talent*



Fewer campus freshmen are choosing computer careers**



Only 20% of computer professionals actively seek jobs through sources like local classifieds.

Which, according to figures from our annual Job Satisfaction Survey, leaves 80% of the market largely unreachable through local papers. Yet easily reached through professional newspapers. Our research can show you how.

Over 213,000 professionals with CICS operating system experience are reachable with a single advertisement.

And so are hundreds of thousands of others with skills from DB2 to IBM S/38 to Unix. How? Call us and we'll show you.

Computerworld reaches professionals with key skills
–a few examples from our survey–

Skill/Product	Product type	Experts in Computerworld's Audience
IBM PC compatible	hardware	547,488
IBM (all but PC)	hardware	462,817
Digital Equip. Corp.	hardware	239,551
MVS	operating system	224,364
Cobol	language/utility	396,565

Free reports!

Our skill survey reveals demographics.

Computerworld just completed a major survey of computer skills among its readers. The results can help you target your recruiting. Call John Corrigan at Computerworld for your free report.

We conduct the most comprehensive salary survey in the field.

Co-sponsored by the Data Processing Management Association, the annual report is available to you at no charge.

If you want to check out our numbers, just call us at this one: 800/343-6474 (in MA, call 508/879-0700). Ask for John Corrigan, Classified Advertising Director. Or write to him at Computerworld, Department N, 375 Cochituate Road, Framingham, MA 01701.

COMPUTERWORLD

Where the qualified candidates look. Every week.

Sources: *International Data Corporation **American Council on Education

COMPUTER CAREERS

University IS poses tough challenges to the unwary

Before making a job switch, consider roadblocks you may face

BY BRYAN K. BEVERLY
SPECIAL TO CW

Managing technology in an academic environment has its unique twists and turns. As an information systems professional and research assistant at Johns Hopkins University in Baltimore, I've come to grips with what these idiosyncrasies are and how they should be dealt with. Any IS executive considering a move to academia should be aware of these problems and some possible solutions, or the transition to academia could be daunting.

- **Lack of hardware and software standardization.** In many universities, faculty members — professors and associate professors — are given free rein in choosing whatever brand of equipment they want as long as the cost is covered by their grants. As a result, professors and their staffs can't easily share information because of multiple workstations and incompatible software programs.

One solution in this freewheeling environment is to set limits on the selection process. While IS managers don't want to restrict faculty members in their research needs, they can provide a limited — but reasonable — list of products that the IS department will support.

- **Inconsistent technical training.** Faculty members place various levels of emphasis on upgrading skills. This results in a lack of consistent technical training, which reduces the efficiency and the effectiveness of the entire university staff. Some faculty members allow ample work time for themselves and their staffs to enhance their technical skills; others don't because of cumbersome teaching and research schedules.

> IN MANY universities, faculty members — professors and associate professors — are given free rein in choosing whatever brand of equipment they want.

The IS manager can address this problem by meeting with appropriate department leaders to emphasize the dire need to enhance the skills of the research and support staff in particular.

This task must be handled with sensitivity if there are concerns that the staff members will leave after an investment has been made in their professional development. While the risk of turnover should be carefully weighed, the scale will likely tip in favor of better training to increase productivity.

- **Mismatches between technology and work load.** Mismatches result in slow turnaround times and user frustration. For example, one department that is more prestigious than another may have more advanced technology than is actually needed. On the other hand, a science department may be working on low-end personal computers for a research project when it really needs high-end processing abilities.

For the latter example, IS managers can help out by collaborating with the faculty on what the needs of a particular project are during the grant application process. If the professor explains the information technology needs of the project, the manager can recommend the best equipment based on the prices and the desired tasks. The collaboration of the faculty and the manager not only ensures proper purchases but also helps the faculty understand the importance of planning information systems for empirical research.

- **Shortage of technical support.** Many universities are shorthanded in this area, which slows the pace of work and forces departments to rely on technical support from outside to maintain hardware and software. Because of the transition from centralized to decentralized processing in the 1980s, one person can't possibly support the technical needs of a large university.

With microcomputers available in every department, the faculty member, staff member or student who is most proficient in any aspect of computers is usually called on to solve everyone's problems, ranging from formatting a disk to installing software. The problem is that these people are perceived as being able to solve all technical problems, and they shouldn't be bogged down with that responsibility if research or other tasks are being done.

The technical support issue can be resolved by hiring one technical support person per department to maintain the information technology. If hiring an additional staff member is not financially feasible, then the alternative step is to designate and train a faculty or staff member to support the department on a part-time basis.

Good information technology in any environment is a must. But special roadblocks exist in academia, and it's helpful to understand what you may be up against before you make a move to a college or university. Based on my experience, techniques such as standardizing the hardware and software, upgrading the skills of the staff, carefully assessing the information needs of projects and staffing each department with a technical support person will improve the productivity of the faculty, staff and students.

Beverly is an IS executive and research assistant at Johns Hopkins University in Baltimore.

COMPUTER PROFESSIONALS

Benson, Douglas & Associates, Inc. is an established leader in the Information Technology Services consulting industry. Our steady growth has created the need for us to expand our staff. BD&A offers a diversity of projects with opportunity for advancement to such positions as Project Manager and Field Support Manager. We offer an exceptional benefits package that includes major medical, dental, 401K and profit sharing. Current requirements are:

IBM - TELON, CICS, IDMS/CAD/CAM, COBOL, DB2, ADABASE/NATURAL,PC-MS/DOS-C, AS/400 - RPGIII, SYNON

VAX - VMS-C, CI-CLUSTER - SYS. MGR, SMARTSTAR, ORACLE, INGRES, SAS, DBMS-CODASYL,UNIX-WINDOWS, MOTIF

HP/3000 - COBOL, FORTRAN, SPL, ASK, SPEEDWARE, MM, PM, PROTOS, TRANSACT, POWERHOUSE

HP/9000 - HPUX, C, UNIX, X-WINDOWS, MOTIF

Call, mail or fax resumes and salary requirements to:

113 Edinburgh South, Suite # 104
Cary, North Carolina 27511
Attention: Jim Hash or Bill Hood
Phone# (919)467-3357 or (800)525-2927
Fax# (919)467-7688

bd&a

AN EQUAL OPPORTUNITY EMPLOYER

Florida
DON'T DREAM THE LIFE, LIVE THE DREAM!!!

Florida, with gentle winds bending the palms and an average temperature of 72°, is one of the finest places to live and work.

AMD Consulting Services is experiencing phenomenal growth. Our customers, Florida's premier information processing centers, have immediate needs for professionals with experience in any of the following:

- COBOL, PLI, ALC, RPG3, "C", CICS
- FOCUS, ORACLE, INFORMIX
- DB2/SQL, IDMS, M204, IMS
- TANDEM COBOL, TAL, PATHWAY
- DEC/VAX, UNIX, PICK
- PCS/ADS, MCCORMACK & DODGE

It's your move, make it the RIGHT ONE.

AMD CONSULTING SERVICES

One Harbour Place
Suite 885 C
Tampa, Florida 33602
(813) 229-9208

SAN FRANCISCO BAY AREA

The Bay Area continues to hire...New openings require the following skills:

- DEC/VMS — Programmer/Analysts, Systems Programmers
- IDMS/ADSO — Programmers, Analysts
- AS-400 — Programmers, Analysts
- C/UNIX — Programmers, Systems Administrators
- DB2 — Programmer/Analysts, Project Leaders
- RDBMS — All levels of ORACLE, INGRES, INFORMIX, and SYBASE

THE SEARCH FIRM, INC.
595 MARKET STREET, SUITE 1400, SAN FRANCISCO, CA 94105
(415) 777-3900 FAX 777-8632

COMPUTER INDUSTRY ANALYSTS

New Science Associates is a worldwide computer-industry consulting and research firm. Our exclusive focus on advanced systems makes us unique in the marketplace. Bring your understanding of technology *and* business to our world-class research team in either Fairfield, CT or Mt. View, CA.

Senior Analyst, Operations & Systems Management:
You should have experience in a mainframe DP shop and be able to speak an operator's language. Knowledge of MVS and key subsystem internals essential, as is an understanding of associated data center issues and organizational dynamics. Familiarity with ISV and PCM products, AI techniques and object-oriented programming a plus.

Senior Analyst, Document Management:
A strong background in enterprise or departmental office systems is essential, with exposure to imaging, text management and retrieval, desktop publishing or multimedia. Experience with databases, cooperative software development or storage management a plus.

For either position you must have *superior* presentation and writing skills. Excellent compensation & benefits. Write our Director of Research describing your unique qualifications. Enclose resume and salary history.

New Science Associates, Inc.
167 Old Post Rd., Southport, CT 06490

FACULTY FOR EUROPE AND ASIA

The University of Maryland seeks faculty to teach undergraduate computer science, computer applications, and information systems management courses on U.S. military bases in Europe and in Asia and the Pacific. Appointments begin August, 1991. Minimum requirements include a master's degree, recent college teaching experience, U.S. citizenship. Benefits include transportation and military base privileges (PX, commissary, etc.). Frequent travel and the cost of schooling make these positions difficult for those with children. Send resume to Dr. Ralph E. Millis, Overseas Programs, The University of Maryland University College, College Park, MD 20742-1642. AA/EEO.

DATA BASE ADMINISTRATOR
Salary to $50K

Our client, a Fortune 500 manufacturer located in the sunny Southeast, has an immediate opening in its start-up-data base group. If you have 3 plus years of senior responsibility in a RDB Database environment and preferably some knowledge of VAX Clusters, this company is ready to talk to you. They offer excellent benefits, high growth, very high visibility and a full relocation package.

Contact Tom Barrett ASAP
CORICO CORPORATION
Two Keeywaydin Drive
Salem, NH 03079
800-772-7027 603-893-4511
Fax: 603-898-8859

CA & AZ CONTRACTS

CONSULTANTS WANTED

PAM

P. Murphy & Associates, Inc.

4405 RIVERSIDE DRIVE, SUITE 100
BURBANK, CA 91505
(818) 841-2002 (714) 552-0506
FAX: (818) 841-2122

Director of Information Technology

Gettysburg College

Gettysburg College is seeking a Director of Information Technology who will provide leadership and support while developing innovative strategies for information dissemination on a campus experiencing rapid technological changes. This is an administrative position, reporting directly to the Associate Provost for Computing. The director will work closely with faculty and staff to develop training programs and other service-related systems, and to support their computing needs. The director also will coordinate and set priorities for all areas of technical service including the computer staff, computer store, printing office and post office.

Technical assistance for all faculty, staff and administrators is provided by the computer staff. State-of-the-art equipment includes a VAX 6310 mainframe and a SUN 4/490 server, six campus computer labs with Apple, IBM and NeXT computers and SUN workstations. Administrative software is run on a PRIME 9955/II. A campus-wide network linking administrative and academic computing and the library system is currently being implemented. Plans for expansion include network hookup in all academic buildings and dormitories as well as connection to the internet.

The successful candidate will have earned a doctorate (or an advanced degree with equivalent professional experience) in a field related to information technology. Significant hands-on experience in computer operations or software development is also essential. A strong interest in distributed systems and microcomputing, as well as the ability to bring new technologies to the campus, is desired.

Gettysburg College is a private, liberal arts college with an enrollment of 1,900 students. The 200-acre campus is located in south central Pennsylvania adjacent to the historic Gettysburg National Park. Several major cities, including Philadelphia and Washington, DC, are easily accessible. The position will remain open until filled. Initial review of applications will begin December 14, 1990. For consideration, submit a letter of application, resume, names and telephone numbers of references to: SEARCH COMMITTEE, Pennsylvania Hall--Box 439, GETTYSBURG COLLEGE, Gettysburg, PA 17325.

---

* COMPUTERS *

SAIL THROUGH THE RECESSION

Al-Khaleej Computers, the largest software house in Saudi-Arabia requires your talents to fill the following positions. We offer excellent **Tax-Free** salaries, free housing, expat/repat & vacation tickets, medical insurance, local transport allowance. Contracts are for one year renewable.

*** MICRO SPECIALISTS ***
PS2, MAC, COMPAQ, DBASE, C, SNA, LOCALTALK, TOKEN RING, 3-COM, U & B.

- SYSTEMS CONSULTANTS - To develop business requirements; H/W & S/W configurations
- BUSINESS ANALYSTS - To develop business applications programs.
- LAN CONSULTANTS - To develop LAN requirements; LAN H/W & S/W configurations.
- COMPUTERS ENGINEERS - To test, install, troubleshoot & repair PCs & peripherals.

*** MAINFRAME SPECIALISTS ***

- DATABASE DESIGN & ADMINISTRATION - IMS, Adabas, M-204
- ANALYSTS - (Any S/W combination) DB/DC, Adabas M-204, Telon, BTS, ADF, Cobol, PL1, Focus.
- SYSTEMS PROGRAMMERS & H/W SUPPORT - XA, ESA, Vtam, Netview.
- DASD & TAPE MANAGEMENT - DFHSM, CA-1, VVDS, DF/DSS, EREP.
- GRAPHICS SPECIALISTS - C, UNIX, GKS, Harvard, Engineering & Business Applications, Intergraph, IGDS, DMRS.

Please send or fax preferably a very detailed C.V. to:

Al-Khaleej HRD, c/o: Informatique Com-Tel
79, rue St-Pierre, Quebec City, Quebec, Canada, G1K 4A3
Fax #: Saudi Arabia: (966-3) 894-6032
Fax #: Canada: (418) 694-9679

SUNBELT & ATLANTA

$25,000 to $95,000
IDMS/CASE/DATACOM/IMS/DB2
VAX/MAPICS/FOCUS/SYS38/AS400
BAL/PLI/DP SALES/TANDEM/COPICS

Need Programmers, Programmer/Analysts for Full-Time and Consulting Positions in IBM Shops. Relocation Expenses Paid. Send resume to:

Jim Heard, EDP Consultants, Inc.
3067 Bunker Hill Road, Suite 202
Marietta, Georgia 30062

FAX: 24-HOURS
404-973-4052 or
404-977-8223

PHONE:
404-971-7281

Sunbelt Opportunities

ADABAS/NAT Prog/Anal's	30-37K
TANDEM Prog/Anal's	30-40K
DB2/SQL Prog/Anal's	30-40K
AS/400-S/38 Prog/Anal's	30-37K
Bank Prog/Anal's	30-36K
Insurance Prog/Anal's	30-35K
Manufacturing Prog/Anal's	32-36K
Retail Prog/Anal's	29-34K
MSA or M&D Prog/Anal's	33-40K
CICS Prog/Anal's	30-36K
IMS DB/DC Prog/Anal's	30-36K
ASSEMBLER Prog/Anal's	29-35K
MVS/COBOL Prog/Anal's	25-30K
VAX/COBOL Prog/Anal's	32-36K
HP 3000-COBOL Prog/Anal's	30-35K
DB2 or IMS DBA's	40-49K
EDP Auditors	33-46K

North Carolina's largest employment agency, in business since 1975, 300 affiliates. Opportunities in the Southeast and nationwide.

Corporate Personnel Consultants

3705-320 Latrobe Drive, Box 221739
Charlotte, NC 28222 (704) 366-1800

Attn: Rick Young, C.P.C.

Why WTW?

Because You're The Best

Wesson, Taylor, Wells - one of the nation's premiere software consulting firms – has challenging careers across the country for top programmer/analysts with application development expertise.

DEC VAX, SMARTSTAR Rdb or Oracle

Senior Positions Jan. '91

Send resume immediately or call:
Wesson, Taylor, Wells
P.O. Box 72137
Atlanta, GA 30007-2137

1-800-833-2892

WTW
SOFTWARE CONSULTING SERVICES

An Equal Opportunity Employer

OUTSTANDING

In the world of electronic defense systems, it's not enough to build precision products, rock-solid systems. We need people who think beyond excellence to imagine innovations of monumental proportions.

At E-Systems Garland Division, we understand that to succeed in the complex world of electronic defense, we have to be better than good. We've got to go one step beyond–to redefine the meaning of precision. Because it's not enough for us to create systems that have never been built before, but to build them within incredible tolerances–specifications that use excellence as the base standard.

So it's no wonder that we're one of America's fastest growing suppliers of electronic defense systems. Outstanding systems, products and technologies come from innovative professionals.

E-Systems Garland Division is a Dallas-based leader in advanced signal and image processing technologies, sophisticated receiver systems, and systems integration for programs like JSIPS and the Distributed Wargaming System.

Be outstanding in your field.

If you're a technical professional, we invite you to stand out with E-Systems Garland Division.

Senior Software Engineers

- UNIX, "C", Ada, Pascal
- X-Windows
- 68000 Firmware
- Sun, Daisy, Micro VAX Workstations
- Cray and IBM Systems Software
- DEC VAX/VMS Software
- Algorithm Development

Senior Hardware Systems Engineers

- Digital Processing (Image and Signal)
- Receiver/Antenna
- RF/IF Communications
- SIGINT/ELINT
- VHSIC, VLSI, MMIC, GaAs
- CAE/CAD/CAM Applications

Management Information Systems

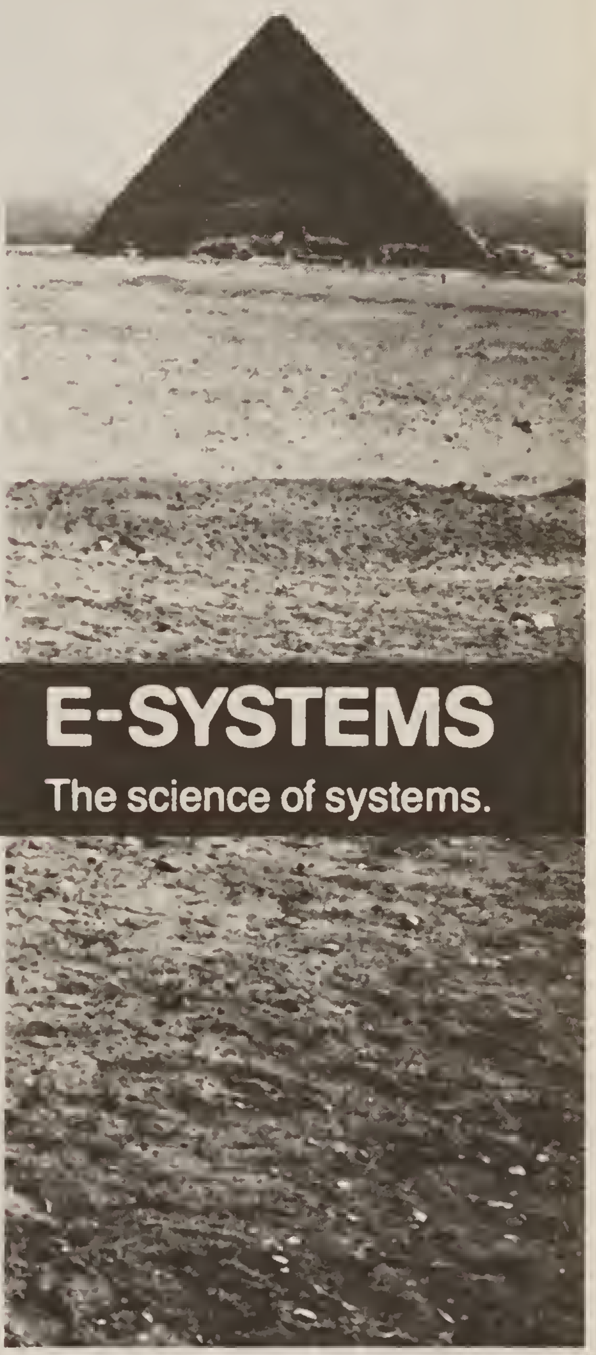
- Business Systems Programming
- IDMS/Cullinet

Support Engineers

- Components
- Quality
- Calibration
- Configuration

Business Development Specialists

- Government/Commercial Programs
- Mass Storage Systems
- Communications Systems



E-SYSTEMS
The science of systems.

Be better than good. Join E-Systems Garland Division today. Send your resume to: Ann Olson, Director of Staffing, E-Systems, Inc., Garland Division, P.O. Box 660023, Dept. 41PY, Dallas, Texas 75266-0023.

Principals only, please
U.S. Citizenship Required
An Equal Opportunity Employer, M/F/V/H

Computer Systems/Software Engineer for analysis, design, development, maintenance and documentation of prototype state-of-the-art software for realtime performance management tools for systems supporting MVS, CICS, DB2 and IMS environments. Must have Bachelor's Degree or equivalent in Computer Science or related field, and a minimum of three years systems programming or systems software engineering experience. Must have demonstrated knowledge of MVS, CICS, DB2 and IMS systems internals, and demonstrated knowledge and abilities in assembly (IBM 370) high-level programming languages, systems design specifications, development, coding unit testing of software solutions, and documentation in an operating-system environment. Salary: $4,416.67/mo. Send resume to Ms. Lowery, Box CW 1290, 1999 Bundy Drive, Los Angeles, CA 90025.

DATA BASE ADMINISTRATOR

Prestigious NC firm has an opening for a Data Base Administrator with experience in DB2, CASE TOOLS, and installation of DB2 applications. Outstanding ground floor opportunity. Salary to low $60's.

Contact **JIM BOSTIC, PHILLIPS RESOURCE GROUP,** P.O. Box 5664, Greenville, SC 29606 or call 803/271-6350 (D), 803/292-1181 (E), or 803/271-8499 (FAX).

MANAGER OF SYSTEMS DEVELOPMENT

Our client, a recognized leader in the industry with multiple installations nationwide, offers a significant opportunity for a qualified MIS Manager to provide "hands-on" leadership in a rapidly growing organization.

This high-visibility position requires substantial management experience with demonstrated success in supervising comprehensive business applications and new development projects. Proven leadership and team-building skills are essential. Experience in forest products or process manufacturing industry is preferred.

Company is located in Northern California. Position carries an attractive compensation and benefit package. (Includes profit-sharing, a 401K savings plan and flexible benefit options).

Candidate should forward a personal resume including salary history, in strictest confidence to: ATTN; RECRUITMENT TSG/SS, 401 PARKPLACE, SUITE 207, KIRKLAND, WASHINGTON 98033.

Our client is an equal opportunity employer.

Pull Your Own Strings

In today's world of mergers and buyouts, your future with a company can be uncertain. You owe it to yourself to take charge of your career and pull your own strings.

TECH FAIR® offers an excellent opportunity for engineers and computer systems professionals to meet face to face with high technology companies who can show you what's available in today's high tech career marketplace.

At TECH FAIR, you can find out your worth, explore new career possibilities and get a closer look at projects and position openings all in an informal, no pressure atmosphere.

So, come to TECH FAIR and pull some strings of your own. There's a TECH FAIR coming to your area soon.

DECEMBER TECH FAIR

December 3 & 4
The Peabody Orlando
9801 International Drive
Orlando, FL

December 5
Bahia Mar Resort & Yachting Ctr
801 Seabreeze Blvd
Ft. Lauderdale, FL

Free Admission. Hours: 3PM-8PM

TECH FAIR® BPI

TECH FAIR is a Trade Mark of Business People Inc.
Sponsored by BPI. For corporate information call: Mpls 612-370-0550; Boston, 508-988-0881; Washington DC, 301-340-6706; Los Angeles, 714-662-3105; Dallas, 214-490-7330. We are not an employment agency.

Great CONSULTING Assignments! and Exceptional FULL TIME Opportunities

Call & send your resume to

MIMI SIMON ASSOC.
90 West Street, Suite 1105
New York, NY 10006

(212) 406-1705
Fax # (212) 406-1768

CONSULTANTS

*** ORACLE * DB2 * MVS**

- * DBA
- * DATA ADMINISTRATION
- * DATA MODELING
- * DESIGN & DEVELOPMENT
- * PROGRAMMERS

NEOTEC INC
P.O. BOX 1601
UNION, NJ 07083

CALL (201) 687-5754

CONSULTANTS NEEDED!

EXCELLENT PAY FOR TOP PEOPLE!

Many Positions Available:

- MVS/C, IMS a plus, Bell System exp. a plus.
- MVS, VSAM, CICS, COBOL, banking and/or Telemarketing exp. a plus.
- UNIX/C, ORACLE or SYBASE a plus.

and much, much more!!

CONSULTING AND FULL-TIME OPPORTUNITIES!

Call and send resume today!

NK Associates, Inc.
760 Alps Road, Dept. C-100
Wayne, NJ 07470
(201) 628-7477

Looking for qualified computer professionals?

Look no further. More that 612,000 computer professionals read Computerworld every week. And you can reach all of them -- or just the ones in your region --with a regional or national recruitment advertisement in Computerworld's Computer Career section.

For more information, call Lisa McGrath at 800-343-6474 (in MA, 508-879-0700); or call your local sales office listed below:

BOSTON: 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171, Nancy Percival, 508-879-0700;

NEW YORK: Mack Center 1, 365 West Passaic St., Rochelle Park, NJ 07662, Valerie Galbo, 201-587-0090;

WASHINGTON, D.C.: 8304 Professional Hill Drive, Fairfax, VA 22031, Katie Kress, 703-573-4115;

CHICAGO: 10400 West Higgins Road, Suite 300, Rosemont, IL 60018, Patricia Powers, 708-827-4433;

LOS ANGELES: 18008 Sky Park Circle, Suite 145, Irvine, CA 92714, Barbara Murphy, 714-250-0164;

SAN FRANCISCO: 18008 Sky Park Circle, Suite 145, Irvine, CA 92714, Barbara Murphy, 714-250-0164.

ANOTHER REASON WHY COMPUTERWORLD RECRUITMENT ADVERTISING WORKS ...

Computerworld gives you large numbers of professionals who work in your industry.

When you're recruiting computer professionals, it's often important to find ones with experience working on systems specific to your industry. From manufacturing to banking, healthcare to insurance, Computerworld reaches the right people in every major industry.

Number of Computerworld Readers with Experience in Key Industries (Entire Career)

Job Industry	of Computerworld's Audience ...
Computer Vendor and Consulting	147,897
Computer Manufacturer	79,521
large-scale computers	37,110
medium-scale computers	45,938
small-scale computers	33,851
personal computers	47,758
technical workstations	24,889
Software Vendor	130,589
for large-scale systems	57,561
for medium-scale	74,967
for small-scale systems	61,274
for personal computers	76,787
for technical workstations	26,379
Non-CPU Computer Products Manufacturer	36,994
VAR/dealer/retailer	27,557
DP Service Bureau/contract DP Services	53,077
Consulting/planning	86,677
Manufacturer (not computers)	168,664
Insurance	52,910
Healthcare	64,729
Banking/financial Services	97,953
Government - federal/state/local	110,399
Business Service (except DP)	40,108
Communications Systems	28,913
Public Utilities	54,364
Transportation	26,031
Wholesale/retail Trade	111,095
Education	125,184

SOURCE: Skill Survey of Computerworld's Audience, May 1989.

To place your ad regionally or nationally, call John Corrigan, Vice President/Classified Advertising, at **800/343-6474 (in MA, 508/879-0700).**

COMPUTERWORLD

Where the best hires look. Every week.

VIPS, Inc.

Join the "Consultants of Choice"

VIPS, Inc., is seeking dynamic, self-motivated DP professionals.

PROGRAMMERS to PROJECT LEADERS

IBM/CICS/COBOL/VSAM

MEDICARE/HEALTH CARE EXPERIENCE A PLUS

For immediate confidential consideration, please call or forward your resume to:

VIPS, INC.
515 Fairmount Avenue • Towson, Maryland 21204
ATTN: Human Resources • (301) 832-8300

EOE/Qualified Applicants Only

RESEARCH TRIANGLE OPPORTUNITIES

Currently recruiting experienced computer pros with background in any of the following: IBM COBOL; CICS; IDMS; IMS; ORACLE; Ingres; Progress; Ideal; Datacom; DB 2; UNIX; HOGAN; Assembler; AS400; DEC/VAX Cobol or Fortran; 2167; Ada; AS/400; Mfg.; Banking; Insurance; MVS, DOS, IMS or CICS Systems Progrs; DEC/VAX Systems Mgrs; Adabas/Natural; Banyon; DB Analysts. Partial listing of local, regional & nat'l fee paid positions. Call or write:

The Underwood Group, Inc.
3924 Browning Pl., Suite 7
Raleigh, NC 27609
(919) 782-3024
FAX (919) 783-0492

SYSTEMS AND COMMUNICATIONS ANALYST; Established, aviation oriented university seeks qualified individual to handle project leadership, analysis and design functions for systems and hardware support. Knowledge of Hewlett-Packard 3000 equipment required. Ability to assume the responsibilities of the Systems Manager when needed. Telecommunications and related experience helpful but not essential. Four year degree in Information Systems or related field. A CDP certification can be substituted. Salary: $23,600 - $28,900 depending on experience. Send resume with cover letter and names and phone numbers of three references to: Human Resources Dept. (CW), Embry-Riddle Aeronautical University, Spruance Hall, Daytona Beach, FL 32114-3900. EOE.

ANALYST & PROGRAMMERS

IBM, OS/MVS, COBOL, CICS, DB2

LET US BE YOUR CONNECTION TO THE FUTURE.

PLEASE CALL OR SEND RESUME TO:

THE COMPUTER CONNECTION
P.O. BOX 824
GRAHAM, NC 27253
ATTN: SHERRY RAMSEY
919-227-5806
FAX#: 919-227-5852

MIS DIRECTORS

If you need good people, we've got them. Computerworld reaches more than 612,000 computer professionals every week. That's more qualified computer pros than any newspaper can deliver. And you can select either a regional edition or national edition of Computerworld's Computer Careers section for your ad.

For more information, or to place your ad regionally or nationally, call Lisa McGrath at 800-343-6474 (in MA, 508-879-0700).

**Computerworld
Weekly,
Regional,
National.
And it Works.**

Artificial Intelligence

We are a world leader in developing Expert System Applications and Tools. A deluge of new business in government systems and advanced manufacturing and process applications, in addition to continued development of our advanced products, has created opportunities for outstanding computer scientists in:

- **Knowledge Engineering**
- **Architecture and Design**
- **Software Engineering**

Requires skills with LISP. Knowledge of C, Relational Databases and Object Oriented Programming helpful.

Westchester, NY and Arlington, VA locations, excellent salary & fringes, stock option plan. Resumes ONLY-No phone calls please.

ARTIFICIAL INTELLIGENCE TECHNOLOGIES, INC.
40 SAW MILL RIVER ROAD
HAWTHORNE, NY 10532

Equal oppty employer

PROGRAMMER/ANALYSTS & SYSTEMS PROGRAMMERS

FOR CAROLINAS AND SOUTHEAST

Numerous opportunities exist for on-line and data base applications P/A's as well as systems programmers and DBA's. Fee Paid Please call or send resume to:

**Keith Reichle, CPC
Systems Search, Inc.
203 Heritage Park
Lake Wylie, SC 29710
803/831-2129**

(Local to Charlotte, NC)

PROGRAMMER/ ANALYST POSITIONS

SYSTEMS PROGRAMMERS

With at least 3 years experience in

- IMS DB/DC, DL1
- NATURAL
- PL1
- DB2/SQL
- VM/MVS
- VAX/VMS
- FOCUS
- CICS
- ADABASE COBOL
- TANDEM RPGII/III
- IDMS/ADS/O
- C LANGUAGE

Please Send Resume to:

MSI **Management Solutions, Inc.**
1416 South
Third Street,
Louisville, KY
40208
502-634-1387

WANTED:
~~DEAD OR~~ ALIVE
CONSULTANTS

MO, KS, NE, IA, IL

JMRoss & Assoc., Inc
PO Box 1724, St. Louis, MO 63043
314-434-1976 / FAX 434-0952
NACCB Member

Systems Professionals

North Carolina Locations

Permanent and Contract Positions—Two or more years' experience.

- **COBOL/CICS**
- **DB2**
- **IMS**
- **PL/1**
- **OS/2/PM**
- **EXCEL**
- **MACINTOSH**
- **INGRES**
- **VM/CMS**
- **C/UNIX/ ORACLE**

5000 Falls of the Neuse Road, Suite 400, Dept. C, Raleigh, NC 27609

Toll-Free: (800) 832-3443
FAX:(919) 876-2127
EOE.

Computer Intelligence, Incorporated

Analyst/Programmer: Develop computerized information, workflow and operational support programs. Confer with organizational units to develop and define data regarding operational procedures and issues and convert to programmable form. Develop and test programs using experience with COBOL, BASIC, Revelation and DDL languages for use on UNISYS and VAX mainframes, IBM and Macintosh PC's and AMOS 1000 minicomputers. Utilize knowledge of hardware and D-Base III Plus, Revelation, Novell 3.0, LOTUS 1-2-3, Clipper and Quick Basic software to teach, train and help users in system. Troubleshoot computer hardware and software problems. $29,300 per year, 40 hours per week, 9:00 a.m. to 5:00 p.m. Must have a Bachelor's degree in Computer Information Systems and two years experience or two years as a Programmer or Programmer/Installer. SEND A RESUME to: Job Service of Florida, 105 East Broward Blvd., Fort Lauderdale, FL 33301-3502. ATTN: Job Order No. FL 0369135.

CONTRACT ASSIGNMENTS

New Jersey and Pa

- SAS
- Oracle
- LANSA
- RPG III
- DB2
  (Focus or Cobol)
- Pansophic, MFG.
- Documerge
- Knowleageware
- AS
  (application system)

DEVON CONSULTING
**435 Devon Park Drive
Suite 410
Wayne, PA 19087**

**Phone#:215-964-2700
Fax#:215-964-2708**

Member NACCB

A Terrific Opportunity

Computer Consulting Group has immediate openings on its consulting staff for talented Programmer/Analysts with 2 or more years experience Excellent salary & benefits We re especially seeking

- **INGRES**
- **C/UNIX**
- **ORACLE**
- **VAX SYS MGR**
- **DB-2/CICS**
- **DEC VAX**
- **IBM 30XX**

Computer Consulting Group
Contract Professional Services

Research Triangle Area
4109 Wake Forest Rd
Suite 307
Raleigh NC 27609
**1-800-222-1273
FAX (803)738-9123**

SUNNY SOUTH

Permanent • Contract

IBM • VAX

AS400, Sys 38	30-42k
Vax Oracle	Call for Details
IBM 30XX, Cobol	30-45k
DB2	35-52k
VAX Cobol	35-40k
Adabas/Natural	30-40k
IMS or IDMS	36-45k
MAPICS or BPCS	30-38k
CICS	35-40k

MAU, INC.
501 Greene Street, Dept. CW
Augusta, GA 30901
(404) 722-6806
FAX (404) 724-8703
ATTN: Lori Braswell or Herb Dew

DP STAFFING SINCE 1969

FLORIDA CONNECTION

Analyst IEF Alabama	$60K
Mgr. Data TCP/IP LAN	$50K
DBA DB2	$45K
VAX SYS MGR - Cluster	$45K
S/A IMS or DB2	$45K
S/A VAX Cobol - Mfg	$45K
P/A IDMS CICS	$43K
P/A MSA GL	$37K
MGR - VAX Tech Spt	$50K
P/A MVS Cobol DB2	$38K
SYS Prog DB2	$50K
P/A MVS COBOL CICS	$36K
P/A IDMS CICS	$40K
P/A MVS IMS DB/DC	$38K
P/A HP ASK, Fortran	$36K
P/A ORACLE SQL	$40K
P/A AS400 RPG3	$35K
P/A MVS Cobol DB2	$36K

Call Russell Bray, CPC
or Cindy Swain
AVAILABILITY, INC
Dept. C.P.O. Box 25434
Tampa, Florida 33622
813/286-8800
FAX: 813/286-0574

IMS/CICS Systems Programmer

SallieMae

What good are leading edge systems without leading edge people?

The technical professionals that we are in search of want the responsibility to make decisions and the latitude to prove their worth. At our Herndon, Virginia data center, that is what you will have...plus the freedom to build on your expertise in performance tuning, capacity planning, troubleshooting, and product installation.

Sallie Mae is a $40.3 billion, AAA-rated financial services corporation that knows our investment in technology can only pay off if we invest in the right people. If you are an IMS/CICS Systems Programmer with 6-8 years experience in an IBM MVS/XA or ESA environment using IMS, DB2 or CICS, this may be the opportunity you are seeking.

We offer an excellent starting salary and a generous benefits package including tuition reimbursement, a 401(k) Tax-Deferred Thrift and Savings Plan, Employee Stock Purchase Plan, and more. Please submit resume, including salary requirements, to Loren Horowitz.

**SALLIE MAE
Student Loan Marketing Association
1050 Thomas Jefferson Street, N.W.
Washington, D.C. 20007**

An Equal Opportunity Employer

SYSTEM DOCUMENTATION PROJECT LEADER

S.W.I.F.T, Society for Worldwide Interbank Financial Telecommunication, Inc., has an immediate opening for a System Documentation Project Leader. The individual we seek will be responsible for developing, maintaining and enhancing system software documentation (on-line) for a complex network system for internal technical staff. An important role will be the selection of tools and methodologies.

The qualifications we are looking for are excellent technical documentation skills and experience in documenting large network based software projects. Knowledge of state of the art tools and methodologies in the field of on-line technical documentation. Exposure to UNISYS A series systems and familiarity with the Macintosh is desirable.

S.W.I.F.T. offers an outstanding salary and benefits program.

Interested applicants should send resume to: Linda Wallace, Assistant Personnel Manager - US, P.O. Box 2005, Culpeper, VA 22701.

S.W.I.F.T.

Equal Opportunity Employer
M/F/H/V

Systems Programmer

General DataComm is currently upgrading to a Hewlett Packard Precision Architecture production environment operating under MPE/XL. As part of this growth, GDC is searching for an experienced Systems Programmer to perform both systems programming and systems management tasks. The focus of this position will be on resource management and capacity planning.

The ideal candidate will possess 4 to 6 years of related experience with 2 to 4 of those years in a technical support role within an HP environment. Supervisory skills are preferred to help coordinate and track group functions. A Bachelors degree or equivalent in experience and/or technical training is required.

In appreciation for your skills, you'll receive an excellent compensation package: 401K, full tuition assistance, company paid medical, dental, vision insurance, profit sharing, and a stock purchase plan. **Qualified applicants are encouraged to send their resume including salary history to: Jocelyn Callis, Human Resources Specialist, General DataComm, Inc., Corporate Headquarters, Middlebury, CT 06762-1299.**

General DataComm, Inc.

We're bolder and better than ever.

An Equal Opportunity Employer M/F/H/V

Work In An Energy Driven Environment.

CAROLINA POWER & LIGHT COMPANY is a major force in Southeastern power generation and distribution. We offer information systems professionals a fast moving environment with the latest in proven technology.

Along with wide use of personal computers, we're operating one IBM 3090-300, one IBM 3090-200, and one Amdahl 5890-300. The CICS on-line environment has been growing at the rate of 40% per year. Recently, we have expanded to a new Data Center. We're operating under MVS/XA and VM/CMS utilizing an SNA/SDLC network consisting of over 3,000 terminals and printers. Our programming languages are COBOL, SQL and DATACOM's IDEAL. We have adopted DB2 as our standard for new application development and are aggressively expanding our use of PC-based and mainframe-based CASE tools.

We have recently completed a large strategic planning study and have a significant backlog of technical and application development projects. We are currently seeking the following:

APPLICATIONS DEVELOPMENT

PROGRAMMERS

Positions require 4+ years of structured coding experience. Highly desired experience would include COBOL, CICS, DB2 and DATACOM. A four-year degree is preferred.

SYSTEMS ANALYSTS

Positions require 4+ years experience in a development environment versus a maintenance environment. Highly desired experience would include structured design techniques, data modeling experience, prototyping and Method/1 knowledge. A four-year degree is preferred.

DATABASE ANALYST

Position requires 4+ years experience utilizing a relational database engine, preferably DB2. Desirable experience includes formal participation in the physical DB design activity of development projects. A four-year degree is preferred.

LAN SUPPORT ANALYST

Requires 3-5 years of technical experience in personal computer support, including a minimum of 1-2 years in the design, implementation and support of Local Area Networks, preferably in a LAN-to-LAN or wide area connectivity environment. Banyan network operating system experience strongly desired. Candidates must possess strong verbal and written communication and client consulting skills. A four-year degree is preferred.

There are few areas in the country as attractive as the Carolinas. The landscape is famous for its rolling hills and magnificent fall colors. The capital city of Raleigh, location of our headquarters, is known for its nationally recognized university programs, sports and proximity to both beach and mountain resorts. Despite its growth, the region has maintained a moderate cost-of-living and its southern charm.

CP&L offers competitive salaries, excellent benefits, and opportunities to advance. If you're interested in becoming part of our important team of professionals, send resume with salary requirements to: **Mary Anne Lynch, Senior Recruitment Representative, Dept. CW12390, CAROLINA POWER & LIGHT COMPANY, P.O. Box 1551, Raleigh, NC 27602.** An Equal Opportunity/Affirmative Action Employer.

CP&L

Carolina Power & Light Company
Energy In Operation

TPF PROGRAMMERS
GLOBAL ASSIGNMENTS

Bedford Associates, Inc., a subsidiary of British Airways, is a leading international technology service firm specializing in management consulting and the development of high performance online transaction sytems using IBM's ACP/TPF operating systems.

Our dynamic organization is currently offering positions for: TPF experience on British Airways Systems and Applications; TPF Communications with interprocessor and SNA knowledge; TPF Test System Programmers; and TPF Applications; ALCS experience.

For career opportunities on exciting and challenging projects in Europe, the Far East, Africa, S. America and the U.S., fax your resume immediately or call our 800 # in N. America. Bedford provides a generous competitive package, including overseas allowance.

Margret Musarella
Recruiting
Bedford Associates, Inc.
101 Merritt 7
Norwalk, CT 06851
800-800-1031
Fax: (203) 846-1487

Bedford Associates Inc.

An Equal Opportunity Employer

Kingdom Of Saudi Arabia

THE INSTITUTE OF PUBLIC ADMINISTRATION

RIYADH, SAUDI ARABIA

Has Immediate openings for Data Processing Professionals working as:

- DATA BASE ADMINISTRATORS (DB2).
- DB2 SYSTEM PROGRAMMERS.
- SYSTEM PROGRAMMERS (MVS/XA JES2 TSO).
- DATA COMMUNICATIONS SPECIALISTS (NCP VTAM LANS)
- DATA PROCESSING MANAGERS OF LARGE ENVIRONMENTS (FOR TEACHING POSITIONS.)

QUALIFICATIONS:

- Minimum 3 years experience.
- Minimum Bachelor Degree.

BENEFITS:

- Attractive salaries.
- Furnished apartments.
- Airline tickets for individuals and their families.
- 45-days paid vacation.
- Free medical treatment at public hospitals.
- Etc...

TAX-FREE INCOME IN SAUDI ARABIA.

Send Resumes and Credentials to:

DIRECTOR GENERAL
ADMINISTRATION AND FINANCIAL AFFAIRS
INSTITUTE OF PUBLIC ADMINISTRATION
P.O. BOX 205
RIYADH 11141
KINGDOM OF SAUDI ARABIA

Fax: (011) 966-1-479-2136 Telephone: (011) 966-1-479-0762
Telex: 401160 IPADMIN

Sai Software Software Software
Consultants, Inc.

***Sai Software**, one of the fastest growing contract programming and consulting firms, has immediate openings for:*

- UNIX, C
- SQL/DS
- IDMS
- REAL TIME APPLICATION
- AS/400, RPGIII
- TECH. WRITER, BKMSTR., BKMGR.
- DB2, TELON, PL/1
- IMS/DB2 - SYS. PROG.
- VAX/VMS, C - TELECOMM. PROJECT LEADER
- UNISYS 1100, MASM, PLUS, COMUS. (NM)
- ORACLE, FORTRAN or C

•HOUSTON•DALLAS
•WASHINGTON

Please call, fax or mail resume to:

Sai Software
Consultants, Inc.
2330 Timber Shadows Ste 2021
Kingwood, Texas 77339
1-800-886-2748
(713) 358-1858
Fax (713) 358-8952

MIS DIRECTORS

If you need good people, we've got them. Computerworld reaches more than 612,000 computer professionals every week. That's more qualified computer pros than any newspaper can deliver. And you can select either a regional edition or national edition of Computerworld's Computer Careers section for your advertisement.

For more Recruitment information, or to place your ad regionally or nationally, call Lisa McGrath at 800-343-6474 (in MA, 508-879-0700).

Computerworld
Weekly,
Regional,
National.

And it Works.

ANOTHER REASON WHY COMPUTERWORLD RECRUITMENT ADVERTISING WORKS ...

Computerworld reaches more highly skilled computer professionals than any other newspaper or magazine -- Sunday, daily, or trade.

629,204 of them to be exact. And this audience is even verified by the Audit Bureau of Circulations (ABC), the largest independent auditor of publication circulations. And from JCL to Unix professionals, DEC VAX to IBM PC professionals, these job candidates have the skills your company needs.

Access DB • Adabas/Natural • Answer/DB • Datacom/
DB • DB2 • dBase • DL/1 • Focus • Ideal • IDMS • IMS •
Informix • IMS DB/DC • Ingres • Inquire • Mantis • Mod-
el 204 • N ra • Sybase
• System ra • Unify •
Universe • ase • CAD/
CAM • 3C r • IBM PC
Network • 's • Disoss •
Wang Offi ADA • ADS
• APL • As Easytrieve
• Fortran • II • RPG III
• SAS • S XA • OS/2 •
PICK • T MS • ACF/
VTAM • • LU6.2 •
NCP/VTA T&T • Con-
trol Data • Cray • DEC VAX • DEC PDP • Honeywell
Bull • IBM Mainframe • IBM S/3X • Data General • Hewlett-Packard • NAS • NCR • Prime • Tandem • Sperry •

For Full Details on The Key Skills Computerworld reaches, call John Corrigan, Vice President/Classified Advertising, at 800/343-6474 (in MA, 508/879-0700).

SOURCE: Skill Survey of Computerworld's Audience, May 1989.

To place your ad regionally or nationally, call John Corrigan, Vice President/Classified Advertising, at **800/343-6474 (in MA, 508/879-0700).**

COMPUTERWORLD
Where qualified candidates look. Every week.

REQUIRED BY WORLD FOOD PROGRAMME OF THE UNITED NATIONS AT ITS HEADQUARTERS IN ROME ITALY

Chief, Systems Development Branch
Information Systems Service

The **World Food Programme** (the Food Aid Organization of the United Nations System) has a vacancy at its Headquarters in Rome in the Information Systems Service for a qualified person to act as Chief of the Systems Development Branch. Applications sought from persons with University Degree in Computer Science or related field; ten years progressively responsible professional experience in the computer field with particular emphasis on Systems Development which should include at least five at supervisory/project management level.

Experience with large database management systems and fourth generation language operating in IBM mainframe environment particularly appreciated. International experience an asset.

The initial appointment will be for three years, with possibility of renewal. Starting salary, depending on qualifications and experience, will be from US$68,000 to US$87,500 net, tax free, plus allowances, relocation grant, education grant and other benefits of the International Civil Service.

Full curriculum vitae should be addressed to: Director of Personnel, World Food Programme, Via Cristoforo Colombo 426, Rome 00147, Italy.

Correspondence should be postmarked by 15 January 1991 quoting Vacancy Accouncement MS-90-07.

World Food
Programme

Due to the volume of applications we receive, only those short-listed will be acknowledged.

World-Class Opportunities Throughout the U.S.

For over 23 years, AGS, a NYNEX Company, has played a major role in designing and building computer software systems for renowned companies in computer manufacturing, telecommunications, financial services, consumer products and government.

We currently have career opportunities in our 50 branch offices for Data Processing Professionals who are eager to begin a "world-class" career by joining a group of AGS' top performers.

Immediate opportunities exist for those with experience developing applications or systems software with:

- **Database or Telecommunications in an IBM environment, including Mainframes and Mid-range.**
- **Database or Telecommunications in a UNIX* environment.**
- **Banking, financial, insurance, or manufacturing industries experience.**

AGS offers outstanding career advancement, competitive salaries, and an excellent benefits package, including medical and dental coverage, training, tuition reimbursement, a 401K savings plan and more.

To find out why over 2,500 computer professionals consider AGS a "world-class" employer, call or send your resume to:

Loree Tisdale
Sr. Technical Resources Mgr.
National Recruiting
AGS Information Services, Inc.
1139 Spruce Drive
Mountainside, NJ 07092

Fax (201) 654-9794
1-800 HIRE AGS

AGS
A NYNEX Company

An Equal Opportunity Employer M/F/H/V.
*UNIX is a trademark of AT&T

Arizona California Colorado Connecticut Delaware Florida Georgia Illinois Indiana Maryland Massachusetts Michigan New Jersey New York North Carolina Ohio Pennsylvania Texas

---

VIEW THE WORLD FROM THE LEADING EDGE.

MANAGEMENT AND INFORMATION SYSTEMS CONSULTANTS

CSC Partners, a vital and progressive subsidiary of the world renowned Computer Sciences Corporation, is expanding our nationwide information systems consulting practice. Our recognized leadership in large-scale systems integration has seen us grow at the rewarding rate of 30% a year for the past 3 years. Today, we're providing high level design and project management services in a broad range of technical environments including IBM (Mainframe, DB2, CICS and the midrange AS400), DEC/VAX, TANDEM and Sun/UNIX.

Our continuing success creates new opportunities nationwide for experienced professionals with proven skills — both in specific industries and large-scale project management — to share in our strategy of growth.

DB2 Consultants/Architects

All Locations

Working with Sr. Business Executives and Sr. IS Managers, you'll bridge the gap between user and technical personnel of Fortune 1000 clients who are expanding their use of DB2 and/or taking the strategic initiative to reengineer applications. You will build the technology infrastructure and data architecture for large-scale systems — acting as full-time architect on a special project or in a consultant/QA design role across multiple projects, depending on project mix. You need 5-10 years of database technology experience to qualify, with a track record of at least 3 years' DB2 architecture experience across multiple application areas. Ability to instruct database design/programming classes is a must. Excellent communication skills, professional image and a high level of motivation are essential. Travel: 20-60% depending on location.

Sr. Project Manager/ Project Directors

All Locations

Interacting with executive sponsors of projects and senior level IS Managers, you will manage or direct large systems integration efforts for Fortune 1000 companies. You'll act as primary focal point of your projects, with overall responsibility from inception to delivery. We're looking for leaders with 10-15 years' experience (with the last 5 in a Sr. Project Manager role) to share our commitment to being a major player in the systems integration arena. Excellent interpersonal and management skills are a must — as is a track record of success in delivering large projects on time, within budget, at a high level of quality.

Account Executives

All Locations

You will implement marketing and sales strategies, locate and define consulting opportunities and manage the business relationship with existing and prospective Fortune 1000 clients. The ideal candidate will possess 7-10 years' combined experience in sales and systems, have an understanding of the complete systems development life cycle, and a desire to play a key role in the growth of a business.

Distribution/Logistics Industry Specialists

San Francisco • Dallas
Philadelphia • Chicago • Boston

Apply your technical and leadership skills and be involved in practice development, large-scale presentations and service delivery. Fifteen to 20 years' experience in distribution-logistics functional areas and/or systems to include Order Entry, Purchasing, Inventory, Warehouse Management and Sales and Customer Support Systems is required. You should be capable of consulting and presenting to senior executives about business and technology issues and trends in this industry. Experience in leading and managing consulting engagement/studies greater than $200,000 is required.

Retail Industry Specialists

New York • Chicago • San Francisco

As a Senior Consultant, you will help organize corporate IS strategy, perform major systems studies, develop IS architecture and provide high level design guidance. The ideal candidate will possess 15-20 years of systems development experience including 5+ years as a consulting manager, director/vice president of MIS in the retail industry or be a senior "user" executive who has had significant systems involvement. Applications experience should include Merchandise Planning, Purchase Order Management, Receiving and Distribution, Inventory Control, Merchandising Allocation and Warehouse Management. The ability to consult at a senior level, help develop and drive large proposal efforts, and travel accordingly is required.

If you're ready to build your future on information technology's leading edge, take a look at Partners now. Please send your resume in complete confidence, noting position and location of preference, to: Mr. Robert M. Nephew, Director of Recruiting, Dept. CW 123, CSC Partners, One University Office Park, Waltham, MA 02154.

An Equal Opportunity Employer.

CSC CSC Partners
A Subsidiary of Computer Sciences Corporation

Boston ■ Chicago ■ Philadelphia ■ New York ■ Minneapolis ■ Dallas ■ New Jersey ■ San Francisco

---

Analyst/progrmr, Dallas area. Utlzng on-site h'ware/s'ware, prvde client spcfd exprtse on projs to design, customize, install various biz & finan'l systems orig or vendor's ware. Respons for systems analysis, user rqmnt doc, wrtng specs, batch & on-line prgrmng, tstng, docmntn, user trng. Reqmnts: (1) Bachelors Comp Sci, Math, or Engrng; (2) 2 yrs exp in job or 2 yrs Progrmr exp to incl analysis/design exp using stpltd tech; (3) exprtse in IBM m'frames, OS/MVS, DOS/VSE, JCL, VSAM, CICS, COBOL. 40 hr wk, 8 am-5 pm. $35,000/yr. Apply at Texas Employment Commission, Dallas, TX or send resume to Texas Employment Commission, Austin, TX 78778, J.O.#6122891. Ad paid by an Equal Employment Opportunity Employer.

UNISYS

PROGRAMMERS

COBOL/DMS II	to $46K
DMS1100	to $46K
MAPPER	to $45K
LINC	to $50K
DMS 1100 SUPPORT	to $60K
EXEC or MCP	to $60K
TRAVELING P/A's	to $45K

Permanent placement for UNISYS Programmers and Analysts throughout the US. FREE service to candidates

COMPUTER STAFFING
call 800/88UNISYS

FOR WINNERS ONLY!

KENTUCKY

Now is the time to enhance your career...Our clients have new and exciting openings for the following skills.

- DB2 Applications Programmers, Designers, Data Base Development, DBA's
- IMS Programmers, Analysts, DBA's
- CICS Programmers, Systems Analysts

For consideration, send resume or call:

TECHNOLOGY CONSULTING, INC.
2020 Meidinger Tower, Louisville, KY 40202
(502) 589-3110 FAX (502) 589-3107

USAA

An Environment Of Achievement.

At USAA, our people-first orientation and aggressive pursuit of advanced technology have built a 68-year tradition of achievement. Today our team spirit, open communication and intensive "Total Quality Management" approach are creating an even stronger achievement environment for the next century.

A Community For Families.

In San Antonio, Texas, you'll discover a rich multi-cultural lifestyle that combines urban amenities, easy commuting and one of the lowest living costs in the nation. It's a great place to raise a family, and we ought to know: USAA's corporate family is one of the biggest and best in San Antonio.

We are currently seeking:

DB2 PROFESSIONALS

PROGRAMMERS with DB2 skills in a maintenance or development environment. Previous exposure to IMS desirable. Minimum of 1-2 years' experience with IBM mainframe applications.

DATA BASE ADMINISTRATOR with experience in the physical implementation of a data model. Requires use of tools: DB2, Explain, Lode. Minimum of 5 years' experience with IBM mainfame applications and/or systems experience.

SYSTEMS PERFORMANCE

SYSTEMS PROGRAMMER with experience required in planning large system configurations, leading systems projects and VM/XA performance tuning. Strong system problem determination and resolution experience necessary. Understanding of concepts involved in developing and maintaining a high performance shared DASD and tape environment is also required.

Other requirements:

- 2 years' experience MVS/ESA or MVS/XA system performance in a multi-CPU, shared DASD system environment.
- Knowledge of the following: OMEGAMON, RMF, CA-FASTDASD, MICS, TSOMON, PAS.

Qualified applicants should send a resume to:

USAA
USAA Building
San Antonio, Texas 78288-0055
Attn: Employment & Placement/TLL/SD/CW
FAX: (512)498-1489

No agencies, please. An Equal Opportunity Employer, M/F/H/V.

COMPUTER PROGRAMMER

The Pacific Stars and Stripes, a US Forces newspaper headquartered in Tokyo, Japan, seeks a Computer Programmer, preferably with Wang VS systems experience. Duties will involve modification and implementation of business application packages. Experience with program generators, COBOL, BASIC, micro-computers and telecommunications in a distributed processing environment is desired. Experience with AP, AR, FA, FL, IC, OE and POS applications in a wholesale/retail publishing and distribution business will be considered a plus. Basic pay is $25,717 per year plus cost-of-living, free quarters or housing allowance, commissary and BX privileges, group insurance and retirement, home leave after 3 years and every 2 years thereafter, as well as other benefits.

Send resume on DA Form 3433, available at any government office - or write to us for the form - and mail it to Pacific Stars and Stripes, ATTENTION: PSS-CPM, APO San Francisco 96503-0110. Application must be received by 26 December 1990.

SOFTWARE OPPORTUNITIES

713/488-7961

Let our national award winning computer specialists assist you in your search. We have over 300 affiliated offices around the country ready to work for you!

SYSTEMS SOFTWARE	$80K +
AS/400, S/38 P/A	TO $48K
LIFE INSURANCE	TO $60K
DB2 ANALYSTS	TO $80K +
IDMS, IMS OR ADABAS	TO $50K
P/A (COBOL OR ALC)	TO $40K
MVS OR VM INTERNALS	$ OPEN
ACF/VTAM/NCP	TO $50K
COBOL/CICS	TO $40K
UNIX INTERNALS	TO $60K +
UNIX/C	TO $55K
COBOL/DB2 OR IMS	TO $48K
EDP AUDITOR	$ OPEN

ROBERT SHIELDS & ASSOCIATES
P.O. Box 890723, Dept. C
Houston, TX 77289-0723
FAX: 713/486-1496

CELLULAR SOFTWARE
DEVELOPMENT ENGINEER

CELLULAR SOFTWARE DEVELOPMENT ENGINEER needed to design, code and test cellular software features which include call processing, call processing maintenance for services such as PTS, CCS7, and ISDN. Test cellular software features to enhance system alarms, operational measurements, and other system resources. Interface and work with customers, and company sales and marketing groups to define custom feature requirements. Interface and support operation departments by providing them with technical guidance. Recommend to management appropriate solutions to technical problems. Requires a Bachelor's in Computer Science or Electrical Engineering and three years experience in job offered or three years directly related digital switching system design environment. 40 hour work week. $47,000 per year. Apply at the Texas Employment Commission, Dallas, Texas, or send resume to the Texas Employment Commission, TEC Building, Austin, Texas 78778. Job Order #6122913. Ad paid by An Equal Employment Opportunity Employer.

Software Engineer; 40 hrs./wk.; 8 am-5 pm; $32,300/yr. Job requires: Masters degree in Computer Science and 1 year experience as a Programmer. Job also reqs.: 1) 1 yr. exp. using C computer language **or** 1 grad. course in which C computer language was studied; 2) 2 grad. crses. in advanced software development; 3) 1 grad. crse. in database management systems; & 4) 1 grad. crse. in which image database **or** computer graphics was studied. Job duties: Develop, modify & enhence graphic computer software for use in vehicle engine testing. Based on customer response, make technical modifications to software. Troubleshoot problems with newly developed software. Serve as technical consultant to users/customers of new software. UNIX operating system, C programming language, & X-Windows user interface will be used to complete job duties. Qualified applicants should send resume & verification of reqs. to: 7310 Woodward, Rm. 415, Detroit, MI 48202. Ref. #90090. Employer Paid Ad.

CONSULTANTS

Burroughs/LINC
Mac 4D
VAX/Oracle
Ideal/Datacom
C++/Smalltalk
Telephony
AS400/Software 2000
DB2/CSP
Adabas/Natural
VAX Systems Mgr/Lge Systems

The Registry

The Registry
1000 Park Forty Plaza
Durham, NC 27713
1-800-338-9119
FAX (919)544-9888
Ask for Chris or Carolyn
Member NACCB

PROGRAMMER/ANALYST -From requirements partake in full cycle software database development including analysis, design, development, testing and implementation. Require Master's in Computer Science and 3 years experience including PORTING & MIGRATION, DB2/CSP, Manufacturing Systems, IBM Mainframe Software Internals and Project Supervision. Salary: $44,000 per annum. Job Location: Los Angeles, CA. Send Resume to: Carol Harris, Code RK, 3345 Wilshire Boulevard, Suite 501, Los Angeles, CA 90010.

The Supercomputer Computations Research Institute, Florida State University, invites applications for an Assistant in Research position to assist computational scientists to develop algorithms with new supercomputer applications and operating system software. A master's degree in science or engineering (computer science preferred) is required with at least five years of experience using supercomputers. Experience in parallel programming on both SIMD and MIMD systems preferred. Send applications with curriculum vitae and three letters of reference by December 14, 1990 to Dr. Dennis Duke, Supercomputer Computations Research Institute, B-186, Florida State University, Tallahassee, Florida 32306-4052 (Equal Opportunity Employer).

Hardware Engineer to work with an engineering team to design Custom/Semi-Custom VLSI chips for high performance microcomputers. Duties include microarchitecture design, logic design, circuit design and logic simulation. Requirements are a Masters Degree in Electrical Engineering or Computer Engineering, knowledge of Computer Processor Organization, Microprocessors and Applications, Operating Systems, Computer Networks, PASCAL or C. Demonstrated ability to design and test a chip using VLSI CAD tools is required. Salary: $38,001.00. 40 hrs/week. No exp. req. If you are interested in, and qualified for the above position, please forward your resume to: Massachusetts Division of Employment and Training, Special Programs Department, 19 Staniford Street, Boston, MA 02114, Case #1089.

Analyst/progrmr, Dallas area. Utizng on-site h'ware/s'ware, prvde client spcfd exprtse on projs to design & install batch & on-line systems to support various biz/commercial/finan'l appls. Perform systems analysis, design, coding, prgrmng & tstng tasks. Prvde tech support to client prof staff. Reqmnts: (1) Bachelors Comp Sci, Math, or Engrng; (2) 2 yrs exp in job or 2 yrs Progrmr exp to incl analysis/design exp using stpltd tech; (3) exprtse in IBM m'frames, OS/MVS/XA, JCL, VSAM, CICS, COBOL. 40 hr wk, 8 am-5 pm. $35,000/yr. Apply at Texas Employment Commission, Dallas, TX or send resume to Texas Employment Commission, Austin, TX 78778, J.O.#6122880. Ad paid by an Equal Employment Opportunity Employer.

Tax Free Salaries • Free Housing • Free Medical/Dental

OVERSEAS

Overseas employment for DP Professionals in most environments. Qualified applicants have 10+ years experience and a college degree. Also, permanent & contract US openings. Resume/salary history to:

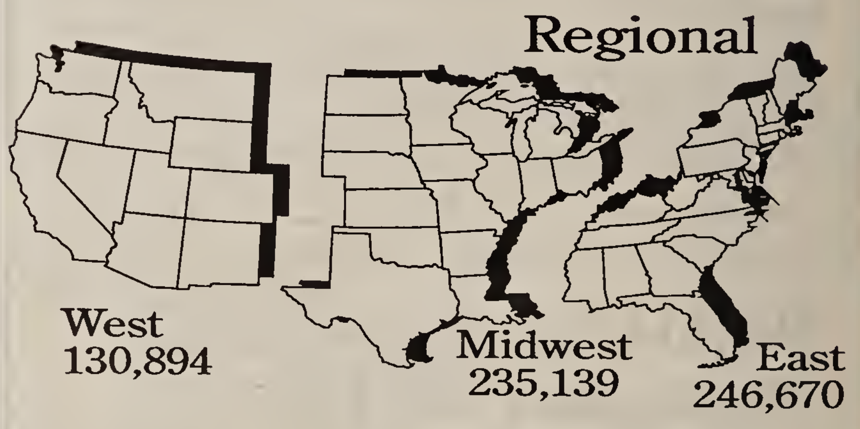
THE LESLIE CORPORATION
400 EAST SAM HOUSTON PARKWAY
SUITE 701-CW
HOUSTON, TEXAS 77060-3534

ANOTHER REASON WHY COMPUTERWORLD RECRUITMENT ADVERTISING WORKS ...

Computerworld gives you the unique option of REGIONAL or NATIONAL recruitment advertising.

Whether you want to run your ad in the Eastern, Midwestern, Western, National, or any combination of regional editions. Computerworld gives you the only regional recruitment advertising section available in the United States exclusively for computer professionals. And no other newspaper or magazine reaches so many qualified computer professionals regionally or nationally!

Computerworld's Total Audience by Region



SOURCE: Audit Bureau of Circulations Supplemental Data Report, May 1987.

To place your ad regionally or nationally, call John Corrigan, Vice President/Classified Advertising, at **800/343-6474 (in MA, 508/879-0700).**

COMPUTERWORLD
Where the best hires look. Every week.

"Computerworld Response Card Decks really opened doors to the 'heavy-hitter' accounts..."

Spectrum Concepts, Inc. is a 10-year-old software developer based in New York City. The company, which provides software and services to large corporations and financial institutions, recently developed XCOM 6.2, an LU 6.2-based software product that dramatically improves file transfer between different computing environments.

XCOM 6.2 eliminates the need for extensive custom programming when transferring data from one computer to another, including PCs, mainframes and minis. And it significantly lessens the amount of time necessary to complete connectivity projects.

Company president Alec Gindis was impressed with industry reaction after a news story announcing XCOM 6.2 appeared in *Computerworld.* So when Spectrum began implementing its marketing strategy for the new product, he considered *Computerworld* a key resource.

"Our goal was to generate sales leads from major organizations — Fortune 500 and Fortune 1000-type companies — that need to transfer files. We decided to use response card decks, and, based on the reaction we got to that product announcement, Computerworld's *was the card deck we thought of first.*

"And it's paid off; the results have been terrific. We've received hundreds of high-quality leads so far, and they're still coming in. In fact, Computerworld *Response Card Decks really opened doors to the 'heavy-hitter' accounts — major organizations that learned about us through the cards.*

"Now we've gotten to where we are recruiting additional account executives to follow up on the volume of these leads. Computerworld *Response Card Decks give us the best cost per lead of any medium. They also let us refine our marketing strategies through scientific 'split testing' — something other card decks don't always offer. We consider that a valuable bonus."*

— Alec Gindis
President
Spectrum Concepts, Inc.

Computerworld Response Card Decks give you a cost-effective way to reach a powerful buying audience of over 134,000 computer professionals. They're working for Spectrum Concepts, Inc. — and they can work for you. Call Norma Tamburrino, Account Manager, *Computerworld* Response Card Decks, at (201) 587-0090 to reserve your space today.

COMPUTERWORLD
RESPONSE CARD DECKS

Computerworld is an IDG Communications Newspaper

MARKETPLACE

Time's up on unlimited toll-free technical support

BY CONNIE WINKLER
SPECIAL TO CW

Software developers are feeling the financial squeeze and are beginning to pass support costs on to their customers. Many vendors are rethinking and retooling product support, especially toll-free help telephone lines.

In the last year, a growing number of developers, including Lotus Development Corp., Microsoft Corp. and Aldus Corp., switched from toll-free 800 lines to 900 numbers, for which customers pay anywhere from $1 to several dollars per minute — plus the cost of the call — to obtain technical support.

"It's terrible. If companies don't make manuals and programs user-friendly enough, they should provide a toll-free help line," says Bruce Stark, president of Computer Tutor, a training and consulting firm in New York. Ironically, Stark stands to benefit indirectly from the developers' new policy. Computer Tutor includes crisis advice as part of its service, and poor vendor documentation and support is a reason why many users sign up in the first place.

Along with offering frequent and costly software updates, Stark says the switch to 900 service is another way vendors are pinching more pennies from their users.

Vendors, however, say they're installing 900 lines to meet the growing needs of their customers. "We were unable to keep up with the demands on our support staff," says Deedee Walsh, director of marketing communications at Buttonware, Inc. in Bellevue, Wash.

About a year ago, after determining that only 20% of its support calls concerned Buttonware products (the rest were either regarding other products or DOS), the developer began researching other alternatives, Walsh says. Consequently, Buttonware installed the 900 option with no charge for the first minute and a $1-per-minute charge thereafter.

Lotus, in Cambridge, Mass., says it put the 900 service into place so it could beef up its support staff to respond to its customers' needs more quickly and efficiently. However, Lotus still has an 800 service that is free for the first six months and $49 annually thereafter.

Customers would rather pay than wait, says Lotus spokesman Bryan Simmons, referring to the typical wait for the 800 service. "Now on 900, Lotus customers can call as many times as they want with the first minute free and then $2 a minute. All 800 and 900 calls are answered by the same support staff, although 900s supersede the others in the queue," he says.

For Aldus, best known for its Pagemaker desktop publishing package, the technical support squeeze came last year. Not only were customers dissatisfied with its slow technical support response, but they were also disillusioned with delayed products. On top of that, says John Archdeacon, director of customer support at Aldus, the complex nature of desktop publishing software also meant customers were calling with conceptual, page design questions — not just technical questions such as how to set tabs in a columnar format.

Eventually, Aldus switched to a 900 service with a flat fee of $15 per counseling session. Prior to that, Aldus had a $100-per-year service contract for up to five hours support time after the free 45-day support period. The $100 didn't sit well with customers who said it seemed like too much money.

After determining that the average length of help calls to Aldus was 12 minutes, Archdeacon set the flat fee at $15 so that customers wouldn't debate on whether Aldus answered the questions fast enough if charged per minute. With this new arrangement, customer support is now a separate entity, almost like a subsidiary, generating its own revenue, Archdeacon says. The customer service department only seeks to break even, he adds.

However, some users are taking active steps to insulate themselves from the costly dilemma. Seafirst Bank in Seattle, with 178 branches throughout Washington state, has its 4,000 Apple Computer, Inc. Macintosh computers cared for by a 60-member support team. "If we didn't have this [in-house support], a lot more calls of a rather elementary nature would go to software developers," says Robert Bowman, vice president and manager of personal computer support at Seafirst.

> MANY LARGE firms disallow any kind of 900 number use because the numbers provide costly access to . . . services such as horoscopes, jokes or X-rated services.

Other companies have unwittingly put up roadblocks to 900 support lines, and they are making other vendors such as Wordperfect Corp. think twice about switching. Many large firms disallow any kind of 900 number use because the numbers provide costly access to other commercial services such as horoscopes, jokes or X-rated services.

Whether users will end up changing products rather than fighting the fees remains to be seen. But few vendors say they expect the free support standards of the past to survive much longer.

"There's a sense that the right to vote and free support go hand-in-hand, but I don't see a lot of situations where's that's true," Archdeacon says.

Winkler is a free-lance writer based in Seattle.

Buy/Sell/Lease

COMPUTER ROOM EQUIPMENT
LIEBERT
Computer Room Air Conditioners
3 thru 22 Ton Units
Main Frame Chillers
3 thru 12 Ton Units
Power Distribution Units
30 thru 225 KVA
PILLER
40 & 75 KVA Silentblocks
LIEBERT, EXIDE, EMERSON
EPE & IPM
18.75 - 556 KVA UPS Systems
RAISED ACCESS FLOORING
Thousands of square feet in stock,
wood and steel.
All items listed are reconditioned with warranty
dp support
DP SUPPORT
P.O. Box 1409
Plano, TX 75086
214-422-4551
214/578-1236 Fax

Go Shopping in...
Computerworld's
CLASSIFIED MARKETPLACE
Call for all the details
(800) 343-6474
(In MA., (508) 879-0700)

IBM SPECIALISTS
SELL • LEASE • BUY
S/34 S/36 S/38 AS/400
3741 3742
- New and Used
- IBM Maintenance Guaranteed
- All Peripberals
- Immediate Delivery
- Upgrades and Features
- Completely Refurbished
800-251-2670
IN TENNESSEE (615) 847 4031
CMA
COMPUTER MARKETING
of America, Inc.
PO BOX 17 • 610 BRYAN ST. • OLD HICKORY, TN 37138

WE BUY and SELL
NEW - USED - AS IS
APOLLO, DEC, HP, SUN, WANG
CDC, MAXTOR, MICROPOLIS
Fax us your excess listings
Call us for current inventory on above
Industrial
Electrosurplus
Tel (508) 768-3480
FAX (508) 768-3479

ICE LTD.
INTERNATIONAL COMPUTER EXCHANGE LTD.
1-800-ICE-BUYS
digital
Data General
sun
apollo
IBM
PC/AT/PS2
BUY • SELL • LEASE • NEW • USED
PERIPHERALS • SYSTEMS • UPGRADES
VAX Station 3100 NEW.......$14,000
IBM NEW....6450604 2MB Mem. .. $350
VT 420..NEW $495
VT 320...NEW . $420
VT 220. USED..$225
IBM NEW ...6450876 80486 Upgrade ... $1,995
Apollo . DN2500 NEW Loaded $7,500
IBM NEW. 34F2933 4MB Mem. $850
HP .. 4MB Mem. ... P/N 98267-A ...$900
INTELL ...82380-20
INTELL ...80486-25
CALL TODAY FOR QUOTE
1-800-ICE-BUYS
INTERNATIONAL COMPUTER EXCHANGE, LTD.
TEL.: (617) 585-8688 • FAX: (617) 585-9177
• 163 MAIN ST. • KINGSTON, MA 02364 •

New/Reconditioned
digital
Equipment
Whatever your requirements are for Digital Equipment, call CSI first! Buying, selling, trading, leasing, consignments - we do it all!
CSI sells all equipment with a 30 day unconditional guarantee on parts and labor and is eligible for DEC maintenance.
Offering systems, disk drives, tape drives, printers, terminals, memory, options, boards, upgrades and many more.
CSI Compurex Systems, Inc.
83 Eastman St.
Easton, MA 02334
Call Toll-Free
1-800-428-5499
In Mass. (508) 230-3700
FAX (508) 238-8250

VAX RENTALS
MV 3600
MV 3800/3900
VAX 6000 SERIES
VAX 8000 SERIES
Systems & Peripherals
- Fast Turnaround
- Dependable Products
- Upgrade/Add-On Flexibility
- 6 Months
- 12 Months
- 24 Months
BROOKVALE ASSOCIATES
CDLA Member Computer Dealers & Lessors Association
ddа Digital Dealers Association
EAST COAST (516) 273-7777
WEST COAST (206) 392-9878

HONEYWELL
NEW/USED EQUIPMENT
- All Models
- Ultimate Equipment
- Older Equipment Available
- Buy-Sell-Lease-Trade
PARTS & REPAIR
FULLY GUARANTEED
PROMPT DELIVERY
Call: Level 6 Systems
1-216-951-2221
BULL

Buy/Sell/Lease

Save 50%
REFURBISHED
WANG
VS • OIS • PERIPHERALS
PCs AND LASER PRINTERS

- Disk Drives, Memory Upgrades, Peripherals and Wang-compatibles
- All equipment guaranteed acceptable for Wang or third-party maintenance.

In Stock for Immediate Delivery Buy, rent or lease
New Wang PCs* at exceptional savings.

wpb
Authorized Wang PC Dealer **1-800-223-9264**
Office Automation Experts Since 1978 *New Wang PCs sold in Wang's Eastern Zone and Southern California only.

HP HP HP HP
NEW and USED
1000 • 3000 • 9000
Including Spectrum
BUY • SELL • TRADE • RENT • LEASE
Processors • Peripherals • Systems
All in Stock - Immediate Delivery
All warranted to qualify for manufacturer's maintenance
ConAm Corporation
It's Performance That Counts!
800/926-6264 213/419-2200
FAX 213/419-2275

B&F Associates inc

- **Data General**
- **Fujitsu**
- **Data Products**
- **CDC**
- **Printronix**
- **Zetaco**

BUY SELL
TRADE
617/982-9664
FAX:
617/871-4456

GTEX FINANCIAL GROUP, Inc.

IBM
BUY SELL
LEASE
PS/2 OPERATING
LEASES
3084 3090
PERIPHERALS
OEM/PCM
LEASES
800-888-7568
FAX 214/783-1379
Member CDLA
EST. 1978

For Sale

Six used Davox 850 Auto Dial systems. Includes all the necessary peripherals to commence calling.

Systems are ideal for
- High volume Calling
- Telemarketing Programs
- Solicitation Programs
- Collection of Receivables
- Customer Surveys

Also available are 4 complete tape to disc conversion systems. Call today for information.
(516) 673-2439

CRS, P.O. Box 5217
Melville, NY 11747

PRIME
EXPERIENCED
SYSTEMS AND
PERIPHERALS
BUY-SELL-LEASE
BROKERAGE
NEW PLUG-COMPATIBLE
DISK, TAPE, MEMORY
PLUS
THE FASTEST I/O
AVAILABLE ANYWHERE
1ST SOLUTIONS, INC.
11460 N CAVE CREEK RD
PHOENIX, AZ 85020
ASK FOR DON SHIFRIS
602-997-0997
Fax: 602-997-1688
CDLA Member Computer Dealers & Lessors Association

COMPUTERWORLD
Classified Marketplace
gives you buyers with extensive purchase influence.

In fact, a full 95% are involved in purchase decision making for their organizations. They determine needs, evaluate technologies, identify solutions, and select products and vendors for the entire range of information systems, as well as related products and services.

So if you're selling computer products and services, advertise in the newspaper that delivers buyers with volume purchasing influence. Advertise in Computerworld's Classified Marketplace!

For more information, call
(800) 343-6474
(in MA, 508/879-0700).

9370's
That's All We Do!
From 20's to 90's
Most Machines, Peripherals & Features
IN STOCK
Call us for a quote
708-831-1255
Executive Infosource
1530 Eastwood Ave., # 100
Highland Park, IL 60035
CDLA Member Computer Dealers & Lessors Association

RENT *RIGHT FROM THE SOURCE.*

High-quality datacomm products from Codex

In-stock products shipped within 24 hours!

Modems — V.32, dial, leased line
Multiplexers
DSUs/CSUs
And much more

Why hesitate?
Call us for a quote
800-446-6336.
Fax: 508-261-7105

- Rent direct from Codex and you'll have valuable equity later if you choose to purchase
- All of the versatility, quality and reliability you've come to expect from today's leading datacomm supplier
- Full Codex warranty and nationwide service - installation also available
- Flexible payment options - check, charge, P.O., or C. O. D.

CODEXPRESS

BUY • SELL • LEASE
AS/400
S/38, 36, 34
SERIES 1

- *SYSTEMS*
- *PERIPHERALS*
- *UPGRADES*

SOURCE DATA PRODUCTS
19762 MacArthur Blvd
•120, Irvine, CA 92715
(714) 851-1970
(800) 333-2669

SPECTRA
EQUIPMENT CORPORATION

(714) 970-7000 (800) 745-1233 (714) 970-7095 FAX

BUY SELL RENT LEASE

ANAHEIM
CORPORATE
CENTER
5101 E. La Palma Ave.
Suite 206
Anaheim
California 92807
LOS ANGELES
SAN JOSE
SEATTLE

IBM	digital	XEROX
9370, 4381	MicroVax	2700
AS400, S/36,S/38	VAX 6000	3700
Point of Sale	VAX 8000	4050
CAD/CAM	***PROCESSORS***	4090
Series/1	***PERIPHERALS***	8790
Banking	***UPGRADES***	9790

Integrity . . . the Spectra difference!
A full line IBM and Digital computer dealer

DATA CENTER
ENVIRONMENTALS
U.P.S. - EXIDE, EMERSON, E.P.E., IPM, DELTEC, PILLAR
A/C - LIEBERT, DATA AIRE, AIRFLOW
D/G SETS - CAT, ONAN, KOHLER
FLOORING - TATE, C-TEC, BESCO
Used/Refurbished - Warranties, Recertification
BUY / SELL / BROKER
Computer Site Technologies, Inc.
262 S. Military Trail • Deerfield Beach, FL 33442
1-800-226-0784

CALL US LAST
GET YOUR BEST PRICE
THEN CALL
COMPUTER BROKERS, INC.
WE
Buy - Sell - Lease
New and Used IBM Equipment
AS400 - System 36, 38, 43XX
SHORT TERM RENTALS
Call 800-238-6405
IN TN 901-372-2622
ascd MEMBER AMERICAN SOCIETY OF COMPUTER DEALERS
COMPUTER BROKERS, INC.
2978 Shelby St., Memphis, TN 38134
"Since 1974"
CB CB CB CB CB CB CB CB CB CB CB CB CB CB

Buying
Selling
DEC - SUN
Data General
Plus
All Peripherals
Call DCC
617-837-7255
or
301-750-7200

FOR SALE
FPS Computing System Model 64/164
Will configure with Disk, Memory & Max. Boards to meet your needs. Other FPS Computing Systems available
International Computing Systems
800-522-4272
Fax: 612-935-2580

HONEYWELL
LEVEL 6 DPS 6
SERIES 16

- **Complete Minicomputer Line -- New & Used**
- **All Peripherals & Terminals**
- **Upgrades and Features**
- **Depot Repair Capability**
- **Honeywell Maintenance Guaranteed**
- **Immediate Delivery Low Prices**
- **HDS 5 and HDS 7 Compatible Terminals**

The Recognized Leader in Honeywell Minicomputer Sales and Support
BCS
BOUDREAU
COMPUTER SERVICES
100 Bearfoot Road
Northboro, MA 01532
(508) 393-6839
FAX 508-393-3781
"Since 1974"

IBM
BUY • SELL • LEASE
AS/400
S-3X
S-23
SERIES ONE
BANKING
EQUIPMENT
AMCOM CORPORATION
800-328-7723
612-949-9400
FAX:
612-949-0750

AS/400 S3X
RS/6000
SERIES/1
937X RT 4300
Currently replacing Series/1's with the new RS/6000 line via EDX to AIX migration
612·942·9830
DATATREND Inc.
10250 Valley View Road, Suite 149
Eden Prairie, Minnesota 55344

1-800-678-9-IBM®
The only number you need to know when buying, selling or leasing IBM® equipment.
IBM IS A REGISTERED TRADEMARK OF INTERNATIONAL BUSINESS MACHINES, INC
NEWPORT LEASING, INC. • 2943 Pullman St. • Santa Ana, CA 92705-5818
OFFICE: 714/476-8476 FAX:714/476-9200

Buy/Sell/Lease

IBM

Member
Computer Dealers
& Lessors Association

CDLA

BUY
LEASE
SELL

(800) 888-2000

9370
4381

SYSTEM
36/38

AS/400

POINT
OF
SALE

SERIES
1

- Processors
- Peripherals
- Upgrades

Dempsey
BUSINESS SYSTEMS
Where IBM Quality Is Second Nature

18377 Beach Blvd., Suite 323
Huntington Beach, CA 92648 (714) 847-8486

HEWLETT PACKARD

1000 ● 3000
9000

Computers
Peripherals
Terminals

Buy ● Sell
Rent ● Lease

EURODATA INC.
2574 Sheffield Road
Ottawa, Canada K1B 3V7
613-745-0921
FAX: 613-745-1172

MAI
BasicFour

MPx 9410

Sale or Lease

Call 617-267-8600

Prime

Experienced
Systems
New & Used
Peripherals
Worldwide Service

Buy - Sell - Lease

OTW, Inc
305 Union St
Franklin MA 02038
508-520-0250

CALL 1-800 345-9370

9370
IN-HOUSE
TECHNICIANS
Buy
Sell
Lease

SSi
**simon
systems
Inc.**

COMPUTERWORLD
CLASSIFIED MARKETPLACE
Examines the issues while computer professionals examine your message. Call for all the details.
(800)343-6474
(In MA., 508/879-0700)

Software

KeyEntry III
PC-BASED DATA INPUT SOFTWARE
Replace Dedicated *Data Entry* Systems
Front-end Mainframe Applications

- ☐ LAN or stand-alone environments
- ☐ Two-pass verification
- ☐ Batch balancing and check digits
- ☐ Operator statistics reporting
- ☐ Embedded-numeric keypad emulation
- ☐ Extensive field edits and table lookups
- ☐ Screen Painter and MenuManager included
- ☐ Batch Control System and Reformat utility
- ☐ User-definable help screens and windows
- ☐ OS/2 version
- ☐ Outstanding customer support
- ☐ Thousands of users worldwide
- ☐ French, Spanish, and German versions
- ☐ Consulting, conversion and integration services

FREE evaluation systems available for qualified companies.

1-800-533-6879

Southern Computer Systems, Inc.
2732 Seventh Avenue South ▪ Birmingham, Al 35233
PHONE (205)251-2985 ▪ FAX (205)322-4851

Send/Receive Faxes Directly From Your:

IBM®
RS6000®

To Receive a
Free
Brochure Call:

708-574-3600
Fax: 708-572-0508

DEVCOM MID-AMERICA, INC.

Conversions

CONVERSION SPECIALISTS

AUTOMATED CONVERSIONS TAILORED TO YOUR NEEDS

DOS TO MVS
PLATFORM TO PLATFORM
HONEYWELL TO IBM
WANG TO IBM
MACRO TO COMMAND
RPG TO COBOL
PL1 TO COBOL
MOST LANGUAGE/CONVERSIONS

BELCASTRO COMPUTER SERVICES, INC.

631 VIENNA AVE.
NILES, OH 44446

(800) 521-2861

It's the
Classified Marketplace
Reach Computer Professionals Where They Shop For:

- ☐ Buy/Sell/Lease
- ☐ Hardware
- ☐ Software
- ☐ Peripherals/Supplies
- ☐ Communications
- ☐ Graphics/Desktop Publishing
- ☐ Time/Services
- ☐ Bids/Proposals/Real Estate
- ☐ Business Opportunity

CALL NOW

800 343-6474
(in MA., 508/879-0700)

Business Opportunities

CD-ROM

Are you seeking an entrance to the expanding CD-ROM market? We market a premier indexing and retrieval system. We train our VAR's in all aspects of CD-ROM. Your clients have many CD-ROM potential applications. We seek Regional, District, and Local VARs. Call or write:

Multimedia Solutions Inc

(713) 681-2044
10555 Northwest Frwy, Ste. 279, Houston, Texas 77092

CLASSIFIED MARKETPLACE
Where Computer Professionals Shop
(800) 343-6474
(in MA; 508/879-0700)

612,000 MIS/DP Professionals see the

CLASSIFIED MARKETPLACE

each week.

Call for advertising information:

(800) 343-6474
(In MA., 508-879-0700)

Bids/Proposals/Real Estate

YORK PUBLIC LIBRARIES NETWORK

REQUEST FOR PROPOSAL

The York Public Libraries Network (YPLN), a cooperative consisting of five municipal libraries, invites proposals for an interconnection system to address its current and future requirements.

The proposed system must meet the need for communications, resource sharing, and interlending between the five libraries in the network as well as accommodate future plans to interconnect with other networks, commercial databases and educational institutions. The system must allow for real time information sharing in a multi-system environment using O.S.I. protocols.

The ideal supplier would be able to provide both software development, hardware, and support for the proposed system.

It is the intent of YPLN to have reviewed all proposals by the 2nd quarter 1991.

Interested parties should contact YPLN no later than December 6, 1990 to receive a copy of the detailed Request for Proposal.

All enquiries should be addressed to:

Jane Horrocks
York Public Libraries Network
c/o Richmond Hill Public Library
475 Edward Avenue, Unit #10
Richmond Hill, Ontario L4C 5E5

PHONE: (416) 770-0310
FAX: (416) 770-0312

MISSISSIPPI CENTRAL DATA PROCESSING AUTHORITY

Sealed proposals will be received by the CDPA, 301 N. Lamar St., 301 Building, Suite 508, Jackson, MS 39201 for the following equipment and services:

RFP No. 1897, due Monday, December 31, 1990 at 3:30 p.m. for the acquisition of hardware, software, installation services and support of a local area network for the MISSISSIPPI SECRETARY OF STATE.

RFP No. 1898, due Thursday, January 3, 1991 at 3:30 p.m. for the acquisition of hardware and software for the upgrade of an existing Motorola Four-Phase minicomputer for the MISSISSIPPI DEPARTMENT OF WILDLIFE, FISHERIES AND PARKS.

RFP No. 1899, due Thursday, January 3, 1991 at 3:30 p.m. for the acquisition of 18 microcomputers, 18 printers and various peripherals and software for the MISSISSIPPI DEPARTMENT OF WILDLIFE, FISHERIES AND PARKS.

Detailed specifications may be obtained from the CDPA office. The CDPA reserves the right to reject any and all bids and proposals and to waive informalities.

Patsy Stanley @ **(801) 359-2604**

Repair and Service of Timeplex T1 Multiplexer Components/Units

The Computer and Data Communications Services Agency of N.Y.C. is soliciting proposals for the maintenance and repair of the two T1 Multiplexer Units which are links between two network hubs of the Citynet Network. To obtain a copy of the Request for Proposals, please contact Jeff Burns at 212-240-4318. A Pre-Proposers Conference is scheduled for December 19, 1990 at 11:00 A.M. in the 9th floor conference room at 253 Broadway, New York, N.Y. 10007. Proposals are due by December 31, 1990 and should be sent to 253 Broadway, 9th floor, New York, N.Y. 10007 Attn: Jeff Burns.

SUBCONTRACTORS

ATTN: Minority and Women Owned Businesses

SYMARK Int'l requests proposals from M/WBE for IBM VTAM software technical support and training. Contact Ms. Betty Guzzo at (818) 889-0978 for bid information by 12/15/90.

Repair of Modems, DSU's, Modem Eliminators and Related Nesting and Power Units.

The Computer and Data Communications Services Agency of N.Y.C. is soliciting proposals for the offsite repair of various types of Modems, DSU's, Modem eliminators and related nesting and power units. To obtain a copy of the Request for Proposals, please contact Jeff Burns at 212-240-4318. A Pre-Proposers Conference is scheduled for December 18, 1990 at 11:00 A.M. in the 9th floor conference room at 253 Broadway, New York, N.Y. 10007. Proposals are due by December 31, 1990 and should be sent to 253 Broadway, 9th floor, New York, N.Y. 10007. Attn: Jeff Burns.

Go Shopping in... Computerworld's

CLASSIFIED MARKETPLACE

Call for all the details

(800) 343-6474
(In MA., (508) 879-0700)

Time/Services

Quality Outsourcing

- ♦ IBM Mainframe/Peripherals
- ♦ Full Technical Support
- ♦ 24 hour Help Desk w/ 800#
- ♦ Database Specialists
- ♦ Consulting Services
- ♦ Network Specialists
- ♦ Capacity Planning
- ♦ Automated Operations

Resources Available Include:

MVS/XA, VM/XA, CMS, CICS, DB2/QMF, TSO/E, ISPF/PDF, SAS, Librarian, IBM IN, PANVALET, EASYTREIVE, Telenet/Tymnet, TOP SECRET

ITAC **Call: (201) 216-3216**
INFORMATION TECHNOLOGY ALLIANCE CORPORATION

REMOTE COMPUTING

- We locate COMPUTER TIMESHARING, including OUTSOURCING on ALL mainframes.
- Since 1968 we have found your LOWEST prices from over 800 nationwide data centers.
- NEVER a charge to the Buyer, because our fee is paid by the Seller.

CALL DON SEIDEN AT

COMPUTER RESERVES, INC.

(201) 882-9700

SUNGARD
COMPUTER SERVICES

. OUTSOURCING EXPERTISE

. FIXED PRICE COMPUTING

. ECONOMICAL PRICES - SIGNIFICANTLY LESS THAN IN-HOUSE

.IBM 3090 COMPUTERS WITH MVS/ESA, AND VM TECHNOLOGY

. EXTENSIVE NATIONWIDE TELCOM NETWORK

. EXTENSIVE LIBRARY OF THIRD PARTY SOFTWARE

. PROFESSIONAL SERVICES FOR APPLICATION SUPPORT & DEVELOPMENT

FOR MORE INFORMATION CALL:
(800) 441-4203 (215) 387-3890
(212) 943-9540

SUNGARD COMPUTER SERVICES INC.
1285 DRUMMERS LANE
WAYNE, PA 19086

OUTSOURCING AND REMOTE COMPUTING

- IBM MVS/XA Environment
- DB2, IDMS/R, Model 204 and 4GLs
- Professional Support Staff
- Experienced Migration Management Team
- Simplified Pricing and Invoicing
- AS/400
- Full Supporting Services
  - Media Conversion
  - Laser & Impact Print Facility
  - Application Programming
- Technical Support
- 24 Hours a Day – 7 Days a Week

May & Speh, inc.
1501 Opus Place, Downers Grove, IL 60515-5713
1(800) 729-1501
For More Information Contact. Tony Ranieri

Computerworld's
Classified Marketplace
needs only 3 days notice to run your ad! Call:
(800) 343/6474
(in MA: 508/879-0700)

Time/Services

COST-EFFECTIVE COMPUTING SERVICES for TODAY and.... TOMORROW

COMDISCO COMPUTING SERVICES CORP.

Provides you with:

REMOTE COMPUTING
COMPUTER OUTSOURCING
FACILITY MANAGEMENT

Featuring:

- IBM® CPUs and Peripherals
- Systems Software: MVS/XA, TSO/E, ISPF/PDF, CICS, VM/XA, VM/SP, HPO, CMS
- Application Software: Database Management Application Development 4/GLs Graphics Statistical Analysis
- Multiple Communications Methods
- Technical Support
- Automated Tape Handling
- ULTRA-Secure Data Center
- Advanced Laser Printing
- Pricing to fit your needs

Call: Robert Marino
201-896-3011

COMDISCO

COMDISCO COMPUTING
SERVICES CORP.
430 Gotham Parkway, Carlstadt, NJ 07072

REMOTE COMPUTING OUTSOURCING

- MVS/XA
- CICS
- DB2
- VM/370
- TSO
- IMS/DBDC
- DOS/VSE
- CMS

OVER 150 SOFTWARE PRODUCTS

- DEVELOPMENT
- PRODUCTIVITY
- DEBUGGING
- PERFORMANCE

- TELENET
- SEARSNET
- TYMNET
- IBM INFORMATION NETWORK

EXTRAORDINARY CUSTOMER SERVICE
MIGRATION MANAGEMENT

GIS INFORMATION SYSTEMS, INC
815 Commerce Drive, Oak Brook, IL 60521

708-574-3636

New England
617-595-8000

ON-LINE WITH COMPUSOURCE

- Multiple centers
- RACF, CICS, IMS
- Volume & term discounts
- Full technical support
- Disaster recovery services
- MVS/XA, VM, DOS
- SAS, DB2
- Worldwide access
- Laser printing

COMPUSOURCE
(919) 469-3325

COMPUTERWORLD
CLASSIFIED MARKETPLACE
Examines the issues while computer professionals examine your message. Call for all the details.
(800)343-6474
(In MA., 508/879-0700)

MCN Computer Services

is your link to perfection.

State-of-the-art IBM compatibility:

MVS-ESA * VM/XA * TSO/E * ROSCOE * CICS * IMS * IDMS/R * DB2 * QMF * PROFS *

Programmer productivity aids:

FILE-AID * CICS PLAYBACK * dBUG-AID * ABEND-AID * CICS ABEND-AID *
(Preceeding products are registered trademarks of Compuware Corporation)

MCN Computer Services provides outsourcing solutions to major international clients. With one of the country's finest computer facilities, your data is secure, yet readily available. High-quality, cost-effective services include:

- Remote computing
- Computer outsourcing
- Facility management

MCN
Computer
Services, Inc.

For more information, call Lisa Walker at:
1-800-521-0444

5225 Auto Club Drive
Dearborn, Michigan 48126

Financial Technologies

Innovative, Responsive, Quality

a few words that describe the most complete computer processor

offering.....

IBM 3090, MVS/XA, MSA, DB2, VM/HPO, TSO, CICS/VSAM and a multitude of third party software

the complete source for ... outsourcing ...

1-800-443-8797

14300 Sullyfield Circle
Chantilly, Virginia 22021

REMOTE PROCESSING

PERSONALIZED SERVICE

- *Guaranteed Service Levels*
- *Fixed Pricing*
- *Peak Load Processing*
- *Disaster Recovery Services*
- *Satellite Communications*
- *Printing & Mail Services*
- *VM/XA, MVS/XA, DOS/VSE*

Agway Data Services Inc.
Call 1-800-ADS-7112
"Committed to Customer Satisfaction"

ICOTECH

MVS/XA	VTAM	DB2
TSO/ISPF/SDSF	FILE-AID	SIMWARE
CICS	INTERTEST	ACF2
ADABAS	SAS	ADC2
LIBRARIAN	$AVRS	

- 24 hour availability
- International access
- Superior technical support staff
- Uninterrupted Power Supply
- Certified on-site vault
- Disaster recovery
- Impeccable service

Call Now - Solve Your Computing Worries

TODAY & TOMORROW!

(201) 685-3400

QUALITY COMPUTING SERVICES

PROCESSING & SYSTEMS OPERATIONS
OUTSOURCING
FACILITIES MANAGEMENT
REMOTE COMPUTING / TIMESHARE

SYSTEMS PLANNING & CONSULTING
STRATEGIC SYSTEMS PLANNING
NEEDS ANALYSIS / FEASIBILITY
QUALITY ASSURANCE PROGRAMS

PROJECT MANAGEMENT
PROJECT LEAD / CONSULTANT SUPPORT
SYSTEMS DEVELOPMENT
SYSTEM / DATA CONVERSIONS

For more information contact Susan Boush at: (206) 924-2527 or (800) 654-9347

Weyerhaeuser
Information Systems
Weyerhaeuser

OUTSOURCING SERVICES

IBM MVS/XA • VM/CMS
TSO • SUPERWYLBUR • CICS • CMS
Extensive Library of 3rd Party Software

"We offer fixed price solutions"

- Professional Services
- Laser Printing
- Capacity Planning
- Nationwide Network
- 24 Hrs/Day, 7 Days/Week
- Over 23 Years Experience

COMPUTER NETWORK SYSTEMS, INC.
(202) 537-2500
5185 MacArthur Blvd., N.W. • Washington, D.C. 20016

STATAB

OUTSOURCING TIMESHARING

FEATURING...

- IBM mainframes & peripherals
- UPS: battery, dual-turbine generator back-up
- Automated print distribution
- 24-hour, 7-day processing
- Full technical support
- Network specialists
- Migration support
- Laser printing: sheet & continuous form

OPERATING ENVIRONMENTS

MVS/XA CICS VM/XA
TSO/E DB2 CMS
ISPF/PDF IMS/DB/DC
VM-MAGIC VPS
FOCUS DOS/VSE

PRODUCTIVITY/ DEVELOPMENT AIDS

SAS EASYTRIEVE PLUS
FILEAID ABENDAID
SPREADSHEET GDDM
IAM COMPAREX
XCOM 6.2 E-MAIL
ACCTG. PKGS. XICS

COMMUNICATIONS/ NETWORKING

T1 SUPPORT TYMNET
TOKEN RING NJE
PROTOCOL CONVERSIONS
PC-HOST SUPPORT
...and much, much more

CALL JOE BALSAMO
(708) 449-2800

STATTAB
a division of
CREATIVE
AUTOMATION
COMPANY
220 Fencl Lane
Hillside, IL 60162
Serving the Nation Since 1936

Defeating computer illiteracy

Computer illiteracy — the unproductive use of systems and software — has escalated to an alarming level in U.S. organizations, according to Elliot Masie, president of the Association for Computer Training & Support (ACTS) in Raquette Lake, N.Y.

A recent survey of 1,000 information systems managers and trainers conducted by ACTS, an international membership organization for computer training and support professionals, revealed that one-third of all computer programs in office environments are cast aside by users six months after purchase.

Masie spoke recently with associate editor Cathleen Duffy on the causes of and solutions to this rising concern.

What kinds of people fall into the computer illiterate category?
We're not talking about people who are computer resistant. A computer illiterate can be two things: A person who doesn't know how to utilize a computer or software tool to perform his job; or a person who dramatically underutilizes the features of a software package or computer.

The first is a more severe problem. Our study found that six months after a person has been sent to train on new software, he is not using that package. Consequently, the company is not getting one cent of return on its investment in either the new technology or the training.

The second type of computer illiteracy — underuse of a particular software package — is less dramatic but more common. A simple thing, like a user not understanding that instead of typing the same paragraph over and over again he could just insert several times, is unproductive.

What are some of the causes of this illiteracy problem?
First, the amount of people who now use computers has dramatically risen in five years, and organizations aren't fully prepared to handle that.

Second, you have your vanity buyers: Users decide, "I want to get Harvard Graphics, Lotus, desktop publishing, and give me that project manager package." They get these packages because they've heard about them, and they sound wonderful. But they have no commitment to take the time to learn how to use them to do their job.

Who's to blame — the IS manager, the user or the company?
Actually, I put the culpability squarely on the actual managers of the users. Unfortunately, line managers have been very poorly prepared for knowing how to manage the automated resources in their departments.

For example, if I'm manager of a purchasing group, and I've got four or five people in my group who use different software, part of what I have to manage is their use of software. But if I don't know how to use the package, I may do a really bad job in managing my staff's use of automation.

What are some things that IS managers and trainers can do to help these line managers?
If a company buys several software packages, IS managers or trainers should conduct a training session directly with the line managers — not on how to use the package, but on how to manage the use of the package.

In other words, show the managers the key features that their employees will need, estimate how long it should take his employees to get up to speed on the package and demonstrate what the package should be able to do in helping the employees perform their work.

ACTS' Masie: *Organizations aren't fully prepared for the increase in computer users*

In what way is the training function in some companies failing?
Because of lack of commitment and low budgets, companies often substitute informal on-the-job training for formal training. But we would never teach somebody how to drive a forklift that way. Companies give people high-powered systems that could be as dangerous to data as a forklift could be to some material in the warehouse — but with only the bare essentials in training.

Even companies that have strong commitments to training run into problems. They teach people how to "do packages" rather than how to do their jobs.

One example that our survey uncovered involved a steam-plant manager who had taken a Lotus 1-2-3 training class. During the course, all the trainer showed him how to do were loan applications — not industrial applications. He walked away deciding never to use that package.

In another case, we found that a division of the Internal Revenue Service had been sending its lawyers off to take generic courses on Wordperfect without much success. Someone made the suggestion to the IRS that they offer essentially the same class, but hold it just for lawyers and call it "Preparing legal briefs using automation." It's psychological, but it works.

Do you see a near end to this computer illiteracy problem?
No. I expect the illiteracy level to reach even higher levels. Organizations just aren't making a commitment to training because it's perceived as expensive — which is false in the long run. They'll just end up doing more support, which will end up being even more expensive.

PROMOTING A BETTER UNDERSTANDING OF
INFORMATION ENGINEERING

CEC is pleased to present the 1991 public offerings of our Information Engineering courses.

Course	Date	Location	Price/Student
IE/Planning	May 6-8	Chicago	$ 895.00
IE/Analysis	Feb. 4-6	Atlanta	$ 895.00
	April 15-17	Detroit	$ 895.00
	May 13-15	Los Angeles	$ 895.00
	June 3-5	New York	$ 895.00
IE/Design	March 4-7	Atlanta	$1195.00
	May 20-23	Detroit	$1195.00
	June 17-20	Los Angeles	$1195.00

For more information about our offerings, please contact the CEC Education Coordinator at:

(313) 569-0900

cec

"The IE Practitioners"

18620 W. 10 Mile Rd. • Southfield, MI 48075-2667

Computer Education at
ComputerLand®
of New York/New Jersey

We're not just Hardware!
Call for a **FREE** course schedule
(212) 952-1509
Mention this ad for a 12% discount on any course.

C & UNIX
$750/person 5 days

Special prices for multiple employees

Over 80 classes completed with fortune 500 companies

CET
(214) 285-5599

Instructor-Led Mainframe Training and Development for IBM and related products.

interact
INFORMATION SERVICES, INC.

914-332-6100
(Within NYS)

800-628-5471
(Outside NYS)

VIDEO'S THE ANSWER!
$49
AI, SQL, C, COBOL
TECHINSIDER
2170 Broadway
Suite 2290
NYC, NY 10024
212\ 362-0559

IBM INSTRUCTOR-LED MAINFRAME TRAINING AT YOUR SITE*
CALL 800-252-6696
FOR OUR CATALOG OF OVER *80 COURSES*
"C"
ASM
COBOL
CICS VSAM
DB2 SQL ORACLE
APPLICATION SYSTEM
DATA COMMUNICATIONS
THE KNOWLEDGE EXCHANGE, INC.
WE'RE NOT BERLITZ
BUT WE SPEAK ALL LANGUAGES
*IBM IS A REGISTERED TRADEMARK OF THE INTERNATIONAL BUSINESS MACHINES CORPORATION

PRACTICAL GUIDE TO LAN PLANNING & INSTALLATION
$149.00
PRACTICAL GUIDE TO LAN SYSTEMS ADMINISTRATION
$99.00
Take Both Selections For $199.00
NovaNet, Inc.
8114 Mizner Lane
Boca Raton, FL 33433
(407) 852-0553
Allow 4-6 Weeks For Delivery

Student Signup System
For: Corp.Information Centers/ Training Companies
- PC Lan (Multi-User)
- Student Signups
- Invoicing
- Scheduling
- Management Reporting

Free Demo Disk
Call (919) 460-0071
Computer Decisions
PO Box 80024
Raleigh, NC 27623

Computerworld's
Training Pages

Gives you the opportunity to reach over 612,000 potential attendees for your seminar/conference!

For more information, call:

800/
343-6474
(in MA, 508/879-0700)

WORLD CLASS EXPERTS
COACH PRICES
Live Via Satellite & Videotape
Bob Holland • Dale Kutnick
Shaku Atre • John McQuillan
Jim Herman • Len Kleinrock
Tim Lister • Dave Crocker
PLUS Over 60 Leading Industry Experts
- 20 Hrs of Programming/month
- Live Interaction Via Satellite
- FREE Ku-Band Satellite System
- Course Notes & Workbooks
- Videotape Library
- As low as $1000/month

The Computer Channel
1-800-488-4224
CCI
COMPUTER CHANNEL INC

COMPUTERWORLD
TRAINING SECTION
Examines the issues while Computer Professionals examine your message.
Call for all the details
(800) 343-6474
(in MA., 508/879-0700)

SALES OFFICES

Publisher/Fritz Landmann

Senior Vice-President/National Sales Director/Kevin Harold, **COMPUTERWORLD**, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 **(508) 879-0700**

BOSTON: Regional Vice-President - North/David Peterson, Sr. District Managers/Bill Cadigan, Sherry Driscoll, District Manager/John Watts, Sales Assistants/Alice Longley, Lisa Bonaccorso, Linda Clinton, **COMPUTERWORLD**, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 **(508) 879-0700**

CHICAGO: Regional Vice-President - Midwest/Kevin McPherson, Senior District Manager/Larry Craven, Sales Assistants/Kathy Sullivant, Karol Lange, **COMPUTERWORLD**, 10400 West Higgins Road, Suite 300, Rosemont, IL 60018 (708) 827-4433

NEW YORK: Regional Vice-President - East/Bernie Hockswender, District Managers/Fred LoSapio, Paula D'Amico, Sales Assistants/Susan Kusnic, Patricia DeBiase, **COMPUTERWORLD**, Mack Center 1, 365 West Passaic St., Rochelle Park, NJ 07662 (201) 587-0090

LOS ANGELES: Regional Vice-President - West/Michela O'Connor Abrams, Southwestern Regional Manager/Fran Cowen. Sales Assistant/Bev Raus, **COMPUTERWORLD**, 18008 Sky Park Circle, Suite 145, Irvine, CA 92714 (714) 261-1230

SAN FRANCISCO: Regional Vice-President - West/Michela O'Connor Abrams, Senior District Manager/Ernie Chamberlain, District Managers/Alicia Saribalis, Michele Gerus, John J. Flood, Sales Assistants/Nurit Zekman, Chris Kobayashi, Carol Lacasse, Lisa Cremarosa **COMPUTERWORLD**, 500 Airport Boulevard, Suite 400, Burlingame, CA 94010 (415) 347-0555

ATLANTA: Regional Vice-President - East/Bernie Hockswender, Sales Assistant/Debra Brown, **COMPUTERWORLD**, 1400 Lake Hearn Drive, Suite 330, Atlanta, GA 30319 (404) 394-0758

DALLAS: Regional Vice-President - Midwest/Kevin McPherson, Southeastern District Manager/Darren Ford, Sales Assistant/Brenda Shipman, **COMPUTERWORLD**, 14651 Dallas Parkway, Suite 304, Dallas, TX 75240 (214) 233-0882

WASHINGTON, D.C.: Regional Vice-President - East/Bernie Hockswender, District Manager/Paula D'Amico, **COMPUTERWORLD**, Mack Center 1, 365 West Passaic St., Rochelle Park, NJ 07662 (201) 967-1350

CLASSIFIED ADVERTISING SALES:
Vice President/Classified Advertising/John Corrigan, Marketing Director/Derek E. Hulitzky, 375 Cochituate Rd., Framingham, MA 01701-9171 (800) 343-6474, In MA **(508) 879-0700**

PRODUCT CLASSIFIED ADVERTISING:
East: Account Manager/Paul Bonarrigo, 375 Cochituate Rd., Framingham, MA 01701-9171 (800) 343-6474, In MA **(508) 879-0700**

West: Account Executive/Bill Creonte, 375 Cochituate Rd., Framingham, MA 01701-9171 (800) 343-6474, In MA **(508) 879-0700**

RECRUITMENT ADVERTISING SALES OFFICES:
New England: Regional Manager/Nancy Percival, 375 Cochituate Rd., Framingham, MA 01701-9171 (800) 343-6474, In MA (508) 879-0700, Account Executive/Andrew Rowe, (800) 343-6474, In MA **(508) 879-0700**

Mid-Atlantic: Regional Manager/Valerie Galbo, Mack Center 1, 365 West Passaic St., Rochelle Park, NJ 07662 (201) 967-1350, Account Executive/Caryn Diott, (800) 343-6474

South-Atlantic: Regional Manager/Katie Kress, 8304 Professional Hill Drive, Fairfax, VA 22031 (703) 573-4115, Sr. Account Executive/Pauline Smith (800) 343-6474

Midwest: Regional Manager/Pat Powers, O'Hare Corp. Twr 1, 10400 W. Higgins Rd., Ste. 300, Rosemont, IL 60018 (708) 827-4433, Account Executive/Ellen Casey (800) 343-6474

West: Regional Manager/Barbara Murphy, 18008 Skypark Circle, Ste. 145, Irvine, CA 92714 (714) 250-0164, Account Executive/Christopher Glenn (800) 343-6474

DIRECT RESPONSE CARDS:
East: Account Manager/Norma Tamburrino, Mack Center 1, 365 West Passaic St., Rochelle Park, NJ 07662 (201) 587-0090

West: Account Executive/Jill Halbert, 18008 Skypark Circle, Ste. 145, Irvine, CA 92714 (714) 250-0164

IDG INTERNATIONAL MARKETING SERVICES:
Managing Director/Frank Cutitta, **COMPUTERWORLD**, 375 Cochituate Road, Box 9171, Framingham, MA 01701-9171 **(508) 879-0700**

West Coast Marketing Manager/Leslie Barner, 3350 West Bayshore Road, Suite 201, Palo Alto, CA 94303 (415) 424-1001

CW PUBLISHING/INC.

An IDG Company: The Worlds Leader in Information Services on Information Technology.

Fritz Landmann
President & Publisher

Computerworld Haadquarters: 375 Cochituate Road, P.O. Box 9171, Framingham, MA 01701-9171
Phone: 508-879-0700, Telex: 95-1153, FAX: 508-872-8564

Val Landi
Senior Vice-President
Special Publications Division

Kavin Harold
Senior Vice-President
National Sales Director

Matthew Smith
Senior Vice-President
Chief Financial Officer

FINANCE **Controller**, Mark Sullivan.

SALES **Advertising Director**, Carolyn Novack. **Vice President Classified Advertising**, John Corrigan. **Marketing Director**, Derek E. Hulitzky. **Classified Operations Director**, Cynthia Delany. **Display Advertising Production Manager**, Maureen Hanley. **Classified Sales Supervisor**, Jay Novack

MARKETING **Vice President/Business Development**, Jan Harper. **Manager, Marketing Communications**, Mary Doyle. **Account Manager, Marketing Communications**, Elizabeth Phillips. **Manager, Trade Show & Conventions**, Audrey Shohan. **Market Development Manager**, Chuck Boyd.

CIRCULATION **Director of Circulation Management**, Maureen Burke. **Director of Circulation Promotion**, Carol Spach.

PRODUCTION **Vica President/Manufacturing**, Leigh Horneth. **Director of Publishing Technology**, Carol Polack. **Production Manager**, Beverly Wolff.

PUBLISHER'S OFFICE **Assistant to the Prasident**, Karen Elliott. **Assistant to tha Senior Vice-President/National Salas Director**, Nancy Gibbs. **Assistant to the Senior Vice-President/Special Publication Division**, Libby Levinson

GLOBAL LEADERSHIP NETWORK

FOREIGN EDITORIAL/SALES OFFICES

ARGENTINA: Ruben Argento, CW Communicaciones S/A, Av Belgrano 406-Piso 9, CP 1092 Buenos Aires. Phone: (011) 54 134-5583. Telex: (390) 22644 (BAZAN AR).

ASIA: S.W. Chan, Asia Computerworld Communications Ltd., 701-4 Kam Chung Bldg., 54 Jaffe Road, Wanchai, Hong Kong. Phone: (011) 852 5 861 3238. FAX: (011) 852 5 86 10953.

AUSTRALIA: Alan Power, IDG Communications Pty. Ltd., 37-43 Alexander Street, Crows Nest, NSW 2065. Phone: (011) 81 2 4395133. Telex: (790) AA74752 (COMWOR). FAX: (011) 61 2 439 5512.

AUSTRIA: Manfred Weiss, CW Publikationen Verlags Ges.m.b.H., Ziegiergasse 6, A-1070 Wien, Austria. Phone: (011) 43 523 16 31 0. Telex: (847) 115542 (SCH/A) FAX: (011) 43 523 05 08 33.

BRAZIL: Ney Kruel, Computerworld do Brazil Ltda, Praca Floriano, 19/26 Andar, 2031 Rio de Janiero, RJ Brazil. Phone: (011) 55 21 240 8225. Telex: (391) 21 30830 BR. **Sao Paulo:** Computerworld do Brazil Ltda., Rua Joaquim Floriano, 488/3 andar-CEP 04534, Sao Paulo, Brazil, Tel: (011) 55 11 852 8536. Telex: (391) 1132017 (WORO BR).

COLOMBIA: Heli Abel Torrado, La Nueva Ley, Computerworld-Columbia, Transv. 23 No. 58-28, Apartodo Aereo 54018, Bogota, O.E. Columbia. Tel: (011) 57 248 9010.

DENMARK: Preben Engell, IDG Danmark A/S, Krujmtappan 4 DK-2500 Valby Denmark. Tel: (011) 45 36 442800. Telax: (855) 31566. FAX: (011) 45 36 442033.

FRANCE: Francois Chaussonniere, IDG Communications S.A., Immeuble La Fayatte, 2, Place des Voques, Cedex 85, 92051 Paris la Defense, France. Tel: (011) 33 1 4904 7900. Telex: (842) 613234F. FAX: (011) 33 1 4904 7800.

HUNGARY: Dezso Futasz, Computerworld Informatika Co., Kft. Pf. 386, 1536 Budapest, Hungary, Phone: (011) 3611 228 458. Telex: (861) 225307 (KSHP H). FAX: (011) 3611 423 965.

INDIA: S.K. Bhayana, Media Transasia India Ltd., 102 Anand Lok, New Delhi 110049, India. Tel: (011) 91 11 644 0110. FAX: (011) 91 11 643 2950.

ITALY: Umberto Costamagna, Computer Publishing Group CPG, Via Vida 7, 20127 Milano, Italy. Phone: (011) 39 2 2613432. Telex: (843) 335318. FAX: (011) 39 2 284 0737.

JAPAN: Jim Povec, IDG Communications/Japan, Kioicho TBR Bldg., 5-7 Kojimachi, Chiyodaku Tokyo 102, Japan. Tel: (011) 81 3 222 6411. Telex: (781) 252 4217. FAX: (011) 81 3 222 6566.

MEXICO: Henry Morales, Computerworld Mexico S.A. de C.V., Oaxaca 21-2, Mexico City 7 O.F. Colonia Roma, 06700 Mexico. Tel: (011) 52 5 514 4218 or 8309. Talex: (383) 177 1300 (ACHAME). FAX: (011) 525 511 4860.

THE NETHERLANDS: Ruud Bakker, IDG Communications B.V., de Paulus Potterstraat 18, 1071 DA Amsterdam, The Netherlands. Tel: (011) 31 20 664 6426/664 5818. Telex: (844) 18242 (CWCOM NL). FAX: (011) 3120 796 006.

NEW ZEALAND: Martin Taylor, IDG Communications Ltd., 2nd Floor, 15 Augustus Terrace, Parnell, Auckland 1, New Zealand. Phone (011) 64 9 779 902 Fax (011) 64 9 774 604.

NORWAY: Morten Hansen, CW Norge A/S, Hovinveien 43, 0576, Oslo 5, Norway Phone: (011) 472 647725. Telex. (856) 76476 (CW NOR N). FAX (011) 47 268 0152

PEOPLE'S REPUBLIC OF CHINA. Shen Yao, China Computerworld, 74 Lu Gu Road, Box 750, Beijing 100039, People's Republic of China. Tel: (011) 861 81 0044 Telex: (716) 222214 (CCW CN).

SINGAPORE: Asia Computarworld Communications, 04-07 Parkway Builders Centre, No.1 Marine Parade Central, Singapore 1544, Republic of China. Phone (011) 65 345 8383. Telex: (786) RS 37003 (Comwor). FAX: (011) 65 345 7097.

SOUTH KOREA: Young-Sil Gimm, Hi Tech Information, Inc. 5th floor, Pungchun Building, 45-1 Wohyo-Ro 1 Ga, Youngsan-Gu, Seoul 140-111, Korea. Tel: (011) 82 2 719 8031. FAX: (011) 82 2 713 5971.

SPAIN: Paco Zabala, CW Communications, S.A., Rafael Calvo, 18, 48, 28010 Madrid, Spain. Phone: (011) 34 1 419 4014. Telex: (831) 45522 (CW E). FAX: (011) 34 1 419 6104.

SWEDEN: Bengt Marnfeldt, CW Communications AB, Sodra Hamnvagen 22, S-115 41 Stockholm, Sweden. Tel: (011) 46 8667 9180. Telex: (854) 14904 9 (NOVACW). FAX. (011) 46 8667 8780.

SWITZERLAND: Gebhard Osterwalder, CW Publikationen AG, Witikonerstrasse no. 15, Postfach 253, CH - 8030 Zurich, Switzerland. Phone: (011) 41 1 55 10 77. Telex: (845) 816 710 (CWCI CH). FAX: (011) 41 1 55 1135.

TAIWAN: David Chu, IDG Communications/Taiwan, 4F-2, No. 137, Fu Hsin South Road, Sec. 1 Taipei, Taiwan, Phone: (011) 886 2 776 4553. Telex: (785) 14142 (ACE-GROUP). FAX: (011) 886 2 721 6444.

LONDON: Richard Ward, CW Communications Ltd., 99 Grays Inn Rd., London, WCI 8UT, United Kingdom. Phone (011) 44 71 405 2347. Telex: (851) 262346. FAX: (011) 44 71 405 2347.

UNITED KINGDOM: Colin Smith, Oliver Smith & Partners, 18 Abbeville Mews, 88 Clapham Park Road, London SW4 7BX, United Kingdom. Phone: (011) 44 1 978 1440. FAX: (011) 44 1 978 1550.

VENEZUELA: Kalman von Vajna Nagy, IDG Comunicaciones C.A., Torre Maracaibo, Piso 10, Oficina H, Av. Libertador, Caracas, Venezuela. Phone: (011) 58 2 72 76 30. FAX: (011) 58 2 724970.

WEST GERMANY: Eckhard Utpadel, IDG Communications Verlag AG, Rheinstrasse 26/28, Postfach 40 04 29, 8000 Munich 40, West Germany. Phone: (011) 49 89 360860. Talex: (851) 5215350. (COMW O). FAX: (011) 49 89 3 60 86257.

INTERNATIONAL DATA GROUP, INC.

Patrick J. McGovern
Board Chairman

Axel Leblois
Vice-Chairman

Walter Boyd
President

William P. Murphy
Vice President/Finance

Computerworld is a publication of International Data Group, the world's largest publisher of computer-related information. International Data Group publishes over 130 computer publications in more than 40 countries. Nineteen million people read one or more International Data Group publications each month. International Data Group's publications include: ARGENTINA'S *Computerworld Argentina;* ASIA'S *Asian Computerworld;* AUSTRALIA'S *Computerworld Australia, PC World, Macworld;* AUSTRIA'S *Computerwelt Oesterreich;* BRAZIL'S *DataNews, PC Mundo;* CANADA'S *ComputerData;* CHILE'S *Informatica, Computacion Personal;* COLUMBIA'S *Computerworld Columbia;* DENMARK'S *CAD/CAM WORLD, Computerworld Danmark, PC World, Macworld, Unix World;* FINLAND'S *Mikro PC, Tietoviikko;* FRANCE'S *Le Monde Informatique, Distributique, InfoPC, Telecoms International;* HUNGARY'S *Computerworld SZT, Mikrovilag;* INDIA'S *Computers & Communications;* ISRAEL'S *People & Computers;* ITALY'S *Computerworld Italia, PC World Italia;* JAPAN'S *Computerworld Japan, Infoworld, Publish;* KOREA'S *Hi-Tech Information/Computerworld;* MEXICO'S *Computerworld Mexico, PC Journal;* THE NETHERLAND'S *Computerworld Netherlands, PC World, Amiga World;* NEW ZEALAND'S *Computerworld New Zealand, PC World New Zealand;* NIGERIA'S *PC World Africa;* NORWAY'S *Computerworld Norge, PC World Norge CAD/CAM, Macworld Norge;* PEOPLE'S REPUBLIC OF CHINA *China Computerworld, China Computerworld Monthly;* POLAND'S *Computers;* SPAIN'S *CIM World, Communicaciones World, Computerworld Espana, PC World, Amiga World;* SWEDEN'S *Computer Sweden, PC/Nyhetharna, Mikrodatorn, PC World, Macworld;* SWITZERLAND'S *Computerworld Schweiz;* TAIWAN'S *Computerworld Taiwan, PC World;* UNITED KINGDOM'S *Graduate Computerworld, PC Business World, ICL Today, Lotus UK, Macworld U.K.;* UNITED STATES' *Amiga World, CIO, Computerworld, Digital News, Federal Computer Week, GamePro, InCider, InfoWorld, International Custom Publishing, Macworld, Network World, PC Games, PC World, Portable Computing, PC Resource, Publish!, Run, Sun Tech Journal;* U.S.S.R.'S *PC World U.S.S.R., Manager, PC Express, Network;* VENEZUELA'S *Computerworld Venezuela, Micro Cmputerworld;* WEST GERMANY'S *Computerwoche, Information Management, PC Woche, PC Welt, Amiga Welt, Macwelt.*

ADVERTISERS INDEX

Ad Counsel	65
AT&T	16-17, 52-53, 72, 73, 92-93, 102
Banyan Systems	62
BMC Software	15
BT Tymnet	63
Cabletron Systems	76
CEO Council	78
Command Technology Corp	55
Communications Research Group	95
Computer Associates	3
Computerland	66-67
CW Circulation	C3
CW Reprints	49
Data Preference	14
Fischer International	25
Genicom	64
Goal Systems	74-75
Hewlett-Packard	20-21
Hitachi Data Systems	33-48
IBM	26, 80-81, C4
IDC	57
Innovation Data Processing	7
Infomart	97
Information Resources	99, 101
Inforum	96
Intel	30-31
Legent Corp	19, 89-91
Micro Focus	51
Microcom	54
Multi-Tech Systems	100
NEC	58-59
NETEC International	78
Network Systems	68
Novell, Inc.	70-71
Nynex	86-87
Oracle Corp	5, 9, 11
Platinum Technology	28-29
Realia	10
Ryan McFarland	79
SAS Institute	56-57, 95
Software 2000	32
Sterling Software	24
Storage Technology	56
Sun Microsystems	84-85
Sybase, Inc.	13
3Com Corp	60-61
Unipress	94
Universal Data Systems	98
U.S. Robotics	88
Wyse Technology	50
Zenith Data Systems	12

This index is provided as an additional service. The publisher does not assume any liability for errors or omissions.

Have A Problem With Your Subscription?

We want to solve it to your complete satisfaction, and we want to do it fast. Please write to:

COMPUTERWORLD, P.O. Box 2043,
Marion, Ohio 43305-2043.

Your magazine subscription label is a valuable source of information for you and us. You can help us by attaching your magazine label here, or copy your name, address, and coded line as it appears on your label. Send this along with your correspondence.

Name
Title
Company
Address
City
State
Zip

Address Changes or Other Changes to Your Subscription

All address changes, title changes, etc. should be accompanied by your address label, if possible, or by a copy of the information which appears on the label, including the coded line. Please allow six weeks for processing time.

Your New Address Goes Here

Name ____________________
Company ____________________
Address ____________________
City ____________ **State** ________ **Zip** ________

Address shown: ☐ Home ☐ Business

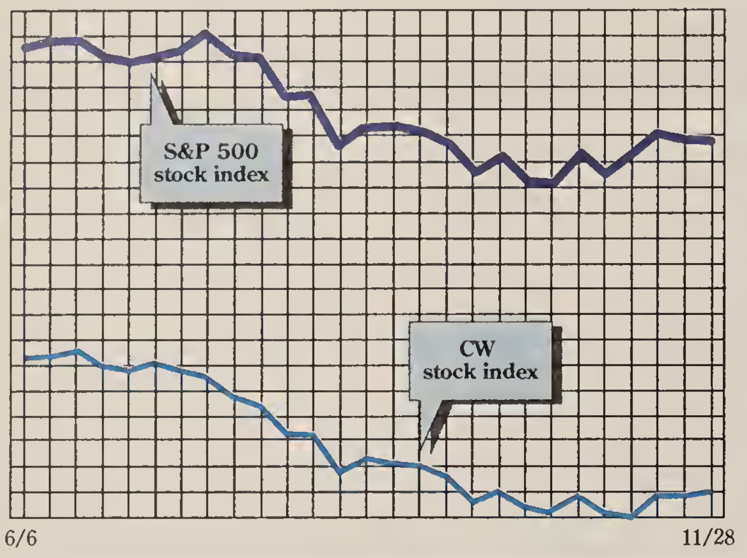
Other Questions and Problems

It is better to write us concerning your problem and include the magazine label. Also, address changes are handled more efficiently by mail. However, should you need to reach us quickly the following toll-free number is available:

1-800-669-1002
Outside U.S. call: (614) 382-3322

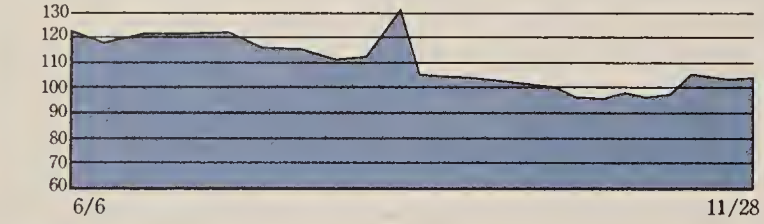
COMPUTERWORLD
P.O. Box 2043, Marion, Ohio 43305

STOCK TRADING INDEX

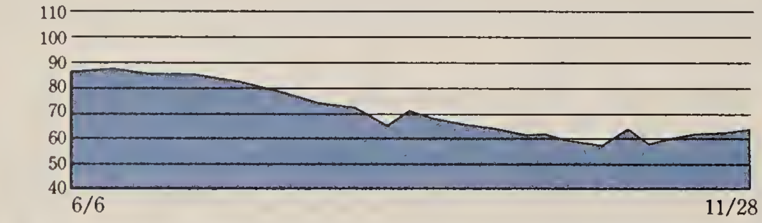


Indexes	*Last Week*	*This Week*
Communications	102.9	**104.1**
Computer Systems	63.6	**65.1**
Software & DP Services	92.4	**95.4**
Semiconductors	38.7	**40.6**
Peripherals & Subsystems	70.4	**71.2**
Leasing Companies	50.7	**48.9**
Composite Index	64.4	**65.5**
S&P 500 Index	134.9	**134.3**

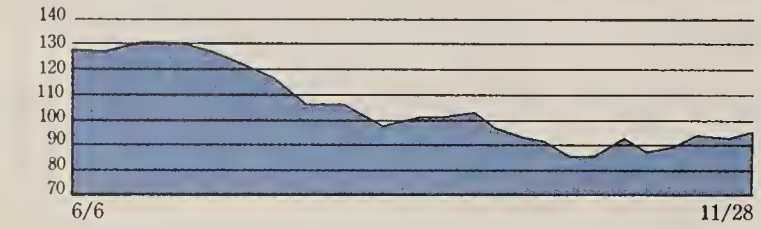
Communications



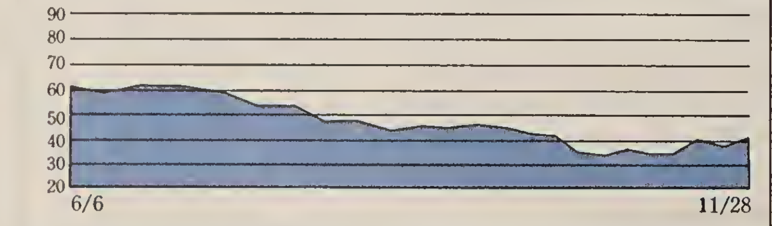
Computer Systems



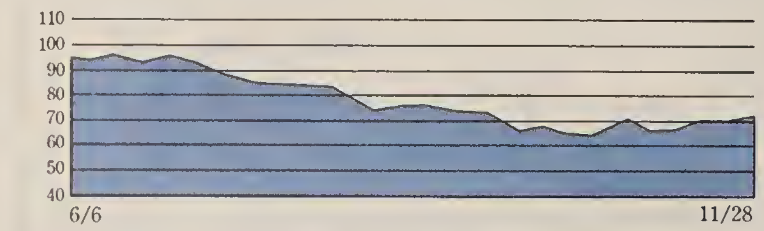
Software & DP Services



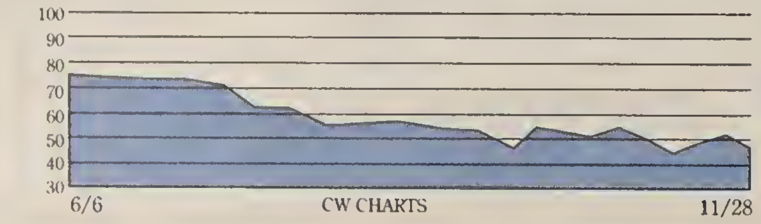
Semiconductors



Peripherals & Subsystems



Leasing Companies



CW CHARTS

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, NOV. 28, 1990

Communications and Network Services

EXCH		PRICE 52-WEEK RANGE		CLOSE NOV. 28, 1990	WEEK NET CHNGE	WEEK PCT CHNGE
N	AMERICAN INFO TECHS CORP	68	53	66.875	0.5	0.8
Q	ANOREW CORP	26	16	19.5	0.0	0.0
Q	ARTEL COMM CORP	10	2	2	-0.3	-11.1
N	AT&T	47	30	31.875	-0.6	-1.9
Q	AVANTEK INC	4	2	2.5	0.1	5.3
N	AYOIN CORP	17	10	11.5	0.5	4.5
N	8ELL ATLANTIC CORP	57	40	53.25	0.1	0.2
N	8ELLSOUTH CORP	59	49	52.875	-0.3	-0.5
Q	COMPRESSION LABS INC	16	7	13.25	-0.6	-4.5
Q	CONTEL CORP	36	23	33.5	0.5	1.5
Q	OATA SWITCH CORP	4	2	3.375	0.4	12.5
Q	OIGITAL COMM ASSOC	27	9	11.25	-0.5	-4.3
Q	DYNATECH CORP	19	12	15	0.0	0.0
Q	FI8RONICS INTNL INC	13	5	7.625	0.3	3.4
Q	GANOALF TECHNOLOGIES	6	2	2.5	-0.4	-13.0
N	GENERAL OATACOMM INDS	5	2	2.125	0.1	6.3
N	GTE CORP	36	24	28.5	0.6	2.2
Q	INFOTRON SYS CORP	9	1	1.125	0.1	12.5
N	ITT CORP	61	40	46.25	-1.5	-3.1
N	M A COM INC	6	3	6	0.4	6.7
Q	MCI COMMUNICATIONS CORP	45	19	19.875	0.9	4.6
N	NETWORK EQUIP TECH INC	34	5	5.875	-0.6	-9.6
Q	NETWORK SYS CORP	15	8	11	0.8	7.3
N	NORTHERN TELECOM LTD	30	21	25	-0.4	-1.5
Q	NOVELL INC	31	13	30.5	1.8	6.1
N	NYNEX CORP	92	67	69.625	-0.9	-1.2
N	PACIFIC TELESIS GROUP	52	36	44.5	0.1	0.3
A	PENRIL CORP	9	5	6.875	0.4	5.8
N	SCIENTIFIC ATLANTA INC	29	9	12.25	0.5	4.3
N	SOUTHWESTERN 8ELL CORP	65	47	54.25	1.8	3.3
Q	3 COM CORP	19	5	7.75	0.3	3.3
N	U S WEST INC	41	32	37.5	0.0	0.0

Computer Systems

EXCH		PRICE 52-WEEK RANGE		CLOSE NOV. 28, 1990	WEEK NET CHNGE	WEEK PCT CHNGE
Q	ALLIANT COMPUTER SYS	9	1	0.875	-0.3	-22.2
Q	ALPHA MICROSYSTEMS	5	1	2.188	-0.4	-16.6
A	AMDAHL CORP	19	10	13.875	0.4	2.8
Q	APPLE COMPUTER INC	48	24	36.75	1.3	3.5
Q	AST RESH INC	27	10	25.5	0.5	2.0
N	8OLT 8ERANEK & NEWMAN	8	4	4.375	0.0	0.0
N	COMPAQ COMPUTER CORP	68	36	52.5	2.6	5.3
N	COMMOOORE INTNL	12	5	9.875	0.9	9.7
Q	COMPUTER AUTOMATION INC	6	0	0.875	-0.1	-6.7
N	CONTROL OATA CORP	22	8	10	-1.1	-10.1
N	CRAY RESH INC	51	20	28.625	0.8	2.7
N	OATA GEN CORP	14	4	4.625	0.3	5.7
N	OATAPOINT CORP	5	1	1.5	0.4	33.3
Q	OELL COMPUTER CORP	14	5	13.125	0.6	5.0
N	DIGITAL EQUIP CORP	95	46	50.125	-1.6	-3.1
N	FLOATING POINT SYS INC	4	0	1.25	-0.1	-9.1
N	HARRIS CORP	36	14	19.25	0.3	1.3
N	HEWLETT PACKARD CO	50	25	29	1.0	3.6
N	HONEYWELL INC	112	71	89.75	1.1	1.3
N	I8M	123	93	112.375	-1.0	-0.9
Q	INFORMATION INTL INC	14	8	9.125	0.0	0.0
Q	IPL SYS INC	14	5	13.25	0.5	3.9
N	MAI 8ASIC FOUR INC	4	1	1.125	0.1	12.5
N	MATSUSHITA ELEC INDL LTO	166	116	124.25	0.0	0.0
Q	MENTOR GRAPHICS CORP	26	9	12.625	0.9	7.4
N	N8I INC	1	0	0.125	0.0	0.0
N	NCR CORP	72	45	55.25	1.0	1.8
Q	PYRAMID TECHNOLOGY	36	12	14	1.3	9.8
Q	SEQUENT COMP SYS INC	34	13	17.75	0.0	0.0
Q	SUN MICROSYSTEM INC	37	15	19.875	1.6	8.9
Q	SYMBOLICS INC	2	0	0.281	0.0	12.4
N	TANDEM COMPUTERS INC	30	9	12.5	0.3	2.0
N	TANDY CORP	44	24	27.75	1.5	5.7
N	ULTIMATE CORP	10	1	2.25	0.6	38.5
N	UNISYS CORP	17	2	2.875	0.0	0.0
A	WANG LA8S INC	6	3	2.75	-0.1	-4.3

Software & DP Services

EXCH		PRICE 52-WEEK RANGE		CLOSE NOV. 28, 1990	WEEK NET CHNGE	WEEK PCT CHNGE
Q	AMERICAN MGMT SYS INC	20	11	15.875	0.6	4.1
Q	AMERICAN SOFTWARE INC	18	8	11.5	1.4	13.6
N	ANACOMP INC	5	1	2	0.0	0.0
Q	ANALYSTS INTL CORP	24	10	13.5	0.5	3.8
Q	ASHTON TATE	15	5	7.75	-0.5	-6.1
N	AUTO OATA PROCESSING	60	45	54.375	0.4	0.7
Q	AUTOOESK INC	60	32	46.25	3.0	6.9
Q	8MC SOFTWARE INC	30	17	21.75	-1.3	-5.4
N	8USINESSLAND INC	12	1	1.375	-0.1	-8.3
Q	COGNOS INC	10	4	7.625	-0.5	-6.2
N	COMPUTER ASSOC INTL INC	17	4	7.75	-0.3	-3.1
Q	COMPUTER HORIZONS CORP	17	8	14.25	0.6	4.6
N	COMPUTER SCIENCES CORP	59	37	47.5	0.8	1.6
N	COMPUTER TASK GROUP INC	12	7	7.25	0.0	0.0
Q	COMSHARE INC	25	14	18	-1.0	-5.3
Q	CORPORATE SOFTWARE	16	4	7.75	0.5	6.9
N	GENERAL MTRS (CLS E)	38	24	35.875	-0.6	-1.7
Q	GOAL SYSTEMS INTL	18	8	9.25	0.0	0.0
Q	HOGAN SYS INC	7	2	2.25	0.1	5.9
Q	INFORMIX CORP	18	4	4.75	0.9	22.6
Q	INTELLICORP INC	8	1	1.75	0.0	0.0
Q	LEGENT CORP	31	17	23	0.3	1.1
Q	LOTUS DEV CORP	39	13	22	3.3	17.3
Q	MICROSOFT CORP	81	38	70.375	2.1	3.1
Q	NATIONAL DATA CORP	35	8	13.75	0.6	4.8
N	ON LINE SOFTWARE INTL INC	11	4	4.375	0.3	6.1
Q	ORACLE SYS CORP	188	5	6.625	0.3	3.9
N	PANSOPHIC SYS INC	19	7	8	0.0	0.0
Q	PHOENIX TECHNOLOGIES INC	5	1	2.5	0.9	53.8
N	POLICY MGMT SYS CORP	43	30	39.25	0.0	0.0
Q	PROGRAMMING & SYS INC	13	5	6	0.5	9.1
Q	RELATIONAL TECH INC	10	3	9.125	0.0	0.0
N	REYNOLDS & REYNOLDS CO	27	12	15.5	0.0	0.0
Q	SAGE SOFTWARE INC	16	8	11	0.0	0.0
Q	SEI CORP	22	15	18	1.3	7.5
Q	SHAREO MEO SYS CORP	17	12	16.25	0.3	1.6
Q	SOFTWARE PUBG CORP	28	12	15.75	-1.0	-6.0
N	STERLING SOFTWARE INC	11	6	7.125	0.1	1.8
Q	SUNGARO OATA SYS INC	26	10	12	-0.3	-2.0
N	SYSTEM CENTER INC	25	6	10.375	1.8	20.3
N	SYS. SOFT INC	29	13	23.75	0.0	0.0
Q	WORDSTAR	2	1	1.063	-0.2	-12.8

Semiconductors

EXCH		PRICE 52-WEEK RANGE		CLOSE NOV. 28, 1990	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADV MICRO DEVICES INC	11	4	4.25	0.1	3.0
N	ANALOG OEVICES INC	10	6	6	0.3	4.3
Q	ANALOGIC CORP	10	8	8.375	-0.1	-1.5
Q	CHIPS & TECHNOLOGIES INC	24	5	7.875	0.1	1.6
Q	INTEL CORP	52	28	37.75	1.0	2.7
Q	MICRON TECHNOLOGY INC	16	7	10	1.1	12.7
N	MOTOROLA INC	88	51	54	2.6	5.1
N	NATL SEMICONDUCTOR	9	3	3.875	0.4	10.7
N	TEXAS INSTRS INC	44	23	31.875	4.6	17.0
A	WESTERN DIGITAL CORP	15	4	5	0.0	0.0

Peripherals

EXCH		PRICE 52-WEEK RANGE		CLOSE NOV. 28, 1990	WEEK NET CHNGE	WEEK PCT CHNGE
Q	ALLOY COMP	2	0	0.188	-0.3	-57.1
N	AM INTL INC	5	1	1.25	-0.3	-16.7
Q	AUTO TROL TECH CORP	4	2	1.875	-0.2	-9.1
Q	BANCTEC INC	24	10	12.25	-0.5	-3.9
A	COGNITRONICS CORP	7	3	6	0.1	2.1
Q	CONNER PERIPHERALS	31	11	25.75	1.1	4.6
A	DATARAM CORP	22	7	7.875	0.6	8.6
N	EASTMAN KODAK CO	44	34	42.625	-0.1	-0.3
N	E M C CORP MASS	10	3	8.25	-0.4	-4.3
Q	EMULEX CORP	9	4	5.5	0.4	7.3
Q	EVANS & SUTHERLANO	35	14	17	0.0	0.0
Q	ICOT CORP	2	0	0.188	-0.1	-39.9
Q	INTERLEAF INC	8	3	3.375	0.0	0.0
Q	IOMEGA CORP	6	3	4.75	0.6	15.2
Q	MASSTOR SYS CORP	3	0	0.375	0.1	50.0
Q	MAXTOR CORP	17	4	4.5	-0.4	-7.7
Q	MICROPOLIS CORP	10	3	7	-0.3	-3.4
N	MINNESOTA MNG & MFG CO	91	74	80.375	-0.3	-0.3
Q	PERSONAL COMP PRODUCTS INC	5	4	4	0.4	10.3
Q	PRINTRONIX INC	15	6	8.625	-0.3	-2.8
N	QMS INC	21	9	12	-0.3	-2.0
Q	QUANTUM CORP	26	9	21	1.0	5.0
N	RECOGNITION EQUIP INC	8	4	4.75	0.3	5.6
Q	REXON INC	10	4	5.563	-0.1	-1.1
Q	SEAGATE TECHNOLOGY	20	6	9.125	0.3	2.8
N	STORAGE TECH CORP	35	11	19.875	1.4	7.4
Q	TANDON CORP	4	1	1.75	0.0	0.0
N	TEKTRONIX INC	19	12	17.125	0.4	2.2
Q	TELEVIOEO SYS INC	1	0	0.281	0.0	12.4
N	XEROX CORP	60	29	33.75	-0.4	-1.1

Leasing Companies

EXCH		PRICE 52-WEEK RANGE		CLOSE NOV. 28, 1990	WEEK NET CHNGE	WEEK PCT CHNGE
N	CAPITAL ASSOC INTNL INC	5	1	0.563	-0.1	-18.2
N	COMDISCO INC	29	15	15.875	0.4	2.4
Q	LDI CORPORATION	18	9	9.75	0.3	2.6
Q	SELECTERM INC	7	3	3	-0.3	-7.7

EXCH: N=NEW YORK; A=AMERICAN; Q=NATIONAL

Necromancy

Tech stocks rose from the grave with the aid of Wall St. buyers

In 1897, Mark Twain said, "The reports of my death are greatly exaggerated." Technology stocks might claim the same. While they are certainly not at the swollen prices of five months ago, when the Dow Jones industrial average brushed the underside of 3,000 points, computer firms plowed ahead of other sectors last week. Compaq Computer Corp. helped lead the way with a 5¼-point gain last week that pushed it to 54¼ by Thursday's close.

Other hardware companies registered vital signs, such as Sun Microsystems, Inc., which lunged forward 2⅛ points to 20½. Apple Computer, Inc. pulsed up ⅜ of a point to 36¾ on news that it and semiconductor firm VLSI Technologies, Inc. formed a joint venture with a British firm to make reduced instruction set computing chips. VLSI fell by ⅝ of a point to 4¼. Digital Equipment Corp. grabbed 1½ more points to 50½.

Personal computer software makers were also alive and kicking. Autodesk, Inc. gained 3½ points to 47¾, and Microsoft Corp. skipped up 2½ points to 71¼. Lotus Development Corp. picked up 2⅞ points, closing Thursday at 22⅜. Even longtime laggard Oracle Systems Corp. surged 1⅜ points to 7⅜.

IBM was one of the few losers last week, slipping ⅝ of a point to 112. Both National Semiconductor Corp. and Lattice Semiconductor Corp. lost ⅛ of a point, closing at 3⅞ and 5⅞, respectively. Other chip makers gained, however, including Texas Instruments, Inc., which picked up 1⅞ points to 31¾. Intel Corp. jumped 2¼ points to 37¾. According to Securities and Exchange Commission reports, Intel Senior Vice President Larry Hootnick sold 99% of his holdings in the company in early October.

Meanwhile, NCR Corp. advanced ¾ of a point to 55½ as would-be partner AT&T lost ½ a point, closing at 31⅝.

KIM S. NASH

HUD

FROM PAGE 1

by the company.

Although the contract does not ask the company to remedy the financial systems shortcomings widely cited as having contributed to the massive misuse of HUD funds during the 1980s, the new environment will facilitate the development of better applications and tighter system controls, according to Peter A. Bracken, vice president and program manager at Martin Marietta. He said other contractors have already begun overhauling the agency's financial and administrative systems.

A HUD spokesman said HUD Secretary Jack Kemp had pledged that no agency employees would lose their jobs as a result of the outsourcing. Data center personnel would be reassigned or lost through natural attrition, the spokesman said.

DelliBovi said the new network will contain checks and balances to prevent wayward transactions, an occurrence that has, for example, resulted in failure to record the sale of houses. He also said the new environment will better support integration of applications.

New directions

Martin Marietta Chairman Norman R. Augustine said the HUD job significantly advances the firm's strategy for diversifying beyond its traditional aerospace and defense roots. He said the contract would have "a positive effect on our 1991 operating earnings and a significant impact into the next century." Last year, the company reported earnings of $307 million on sales of $5.8 billion, most of it from defense and aerospace work.

"Their [diversification] strategy is working," said Peter Aseritis, defense analyst at First Boston Corp. "Going after civilian agencies plays to their strengths. Martin Marietta is a very good information processing company, and they're good at setting up a disciplined network of suppliers."

Aseritis predicted more big federal outsourcing deals. "Outsourced services can be done cheaper and more efficiently than they can in-house."

James Kerrigan, federal program director at Input, Inc.'s Vienna, Va., office, said other forces are stimulating outsourcing as well. Federal agencies often specify limits on employment, and contracting out is one way to save on body count without sacrificing the agency's mission. He also said the growing disparity between pay scales in the public and private sectors is making it difficult to retain the senior systems people needed at large data centers.

Companies that submitted losing bids for the huge job included Electronic Data Systems Corp. and Boeing Computer Services. Neither company would say whether it planned to protest the award — a common practice in federal systems megadeals.

"A protest is inevitable," said Kerrigan, who estimated each bidder spent about $5 million developing proposals. "Besides, procurement rules for something like this are so complex, the odds are very good that HUD did do something wrong. There are so many hoops to jump through, it's easy to miss one."

About 40% of the contract revenue will flow to 13 subcontractors, principally Unisys, Hitachi, Network Systems Corp., Netrix Corp., Amax Engineering Corp. and Novell, Inc., Bracken said.

Advisor delays EPA report

The White House Science Advisor has delayed public release of an Environmental Protection Agency (EPA) report on potentially harmful effects of electromagnetic fields, such as those emanating from VDTs.

Due for public release early last week, the EPA evaluation discusses potential carcinogenicity and other biological effects of electromagnetic fields. It was delayed after project leader Robert McGaughy was called into the advisor's office last Monday.

The White House was trying to delay the release of the report until after the Scientific Review Board, a panel of outside experts, had finished its review, which is expected to be completed sometime in the spring, McGaughy said.

McGaughy said administration officials are concerned that electromagnetic fields are affecting everyone through exposure to such things as power lines, electric blankets and VDTs, unlike other potentially cancer-causing materials where exposure is more selective.

Efforts to reach White House officials for comment were unsuccessful.

McGaughy said he "expected," then changed his word to "hoped," that the report would be made public this week.

J. A. SAVAGE

Bankamerica axing Asian hub

Closing Hong Kong center in bid to consolidate international operations

BY JIM NASH
CW STAFF

HONG KONG — Bankamerica Corp. is shutting down its Asian data center. In a cost-cutting move, the resurgent multinational financial company is consolidating its three international processing centers at one suburban London location.

Dan Hartman, vice president and general manager of Bankamerica's Asian Pacific operations, said the bank's Latin American processing center was moved from Los Angeles to Croydon, England, in the first quarter of this year. The Hong Kong center is expected to follow in April 1991.

"The overall objective is to save money," said Hartman, who has worked for Bankamerica in Asia for six years. While he refused to reveal how much the move will cost, "the savings will be significant," Hartman said. The move will pay for itself in "two to three years," he added, and will have no effect on domestic transactions. While there are links between domestic and international transaction databases, Bankamerica treats the two as separate operations.

Croydon was the logical choice, Hartman said. The facility already has the hardware, floor space and brainpower to accommodate all of Bankamerica's international banking transactions.

He explained that the Croydon data center currently processes all European transactions with a new Amdahl Corp. 5995 1400 mainframe and a 5890 300E. Just as important, however, is Croydon's role in developing all application software for the bank's international branches.

When the move is completed, Croydon will become the on-line hub for all internationally generated voice and data transactions for Bankamerica. A fiber-optic backbone will connect telecommunications hubs in both of the former data centers to the England center, Hartman said. The site will be backed up by a British Telecom disaster recovery center also in England.

A combination of cable and satellite methods will continue to link local branches in each of the three regions.

Each transaction generated abroad will be processed in real time through the English center, Hartman said. "We deal with a lot of multinationals, and they are not willing to wait until the close of business to have a transaction completed in Bangkok or Tokyo."

Latin America operations were moved because they made up only a small portion of the total business process in the Los Angeles office, he explained. Afterward, the bank saw that despite increased telecommunications costs, the move was actually cost-effective. In June, it examined shifting to Hong Kong for increased savings.

> "THE OVERALL objective is to save money."
>
> DAN HARTMAN
> BANKAMERICA

A spokesman for the bank said the planned transfer of British sovereignty over Hong Kong to China in 1997 played little or no part in the decision to move operations. "It's a matter of constant streamlining. Maybe, way in the back of somebody's mind, someone thought of that, but it was not discussed," the spokesman said.

DEC unveils integrated net security program

BY MARYFRAN JOHNSON
CW STAFF

MAYNARD, Mass. — Digital Equipment Corp. launched an integrated security program last week aimed at solving corporate security problems on networks of multivendor computers.

Included in the long-range development program is DEC's Distributed System Security Architecture, a framework for implementing security features in a distributed, multivendor environment.

Peter Schay, an analyst at Gartner Group, Inc., based in Stamford, Conn., noted that much of DEC's security program will not be available until 1992 for users of VMS and Ultrix, DEC's version of Unix. Multivendor shops have a longer wait, he added.

A series of security enhancements was announced last Friday, including the following:

- Additions to the VMS operating system password management to deter attacks based on guessing user or systems account passwords.
- New management features in DEC's Ethernet Enhanced Security System, which will provide node authentification, access control and encryption.
- Development of a Compartmented Mode Workstation (CMW) that will meet the U.S. government standards for B1 and CMW "level of trust." DEC is developing the highly secure workstation under contract with the U.S. Defense Intelligence Agency, basing the machine on both reduced instruction set computing and VAX architectures, the Ultrix operating system and X Window System/Motif.
- Availability through DEC of Sybase, Inc.'s Secure SQL Servicer, a multilevel secure relational database management system that runs on VAX Ultrix systems.

SPA hits two Chicago firms

CHICAGO — The Software Publishers Association (SPA) said last week it had conducted search-and-seizure operations at two corporations in Chicago suspected of unauthorized duplication of software.

The SPA disclosed that one of the raids was here at Davy-McKee Corp., a pharmaceutical engineering organization. The SPA initially said it had reached a settlement with Davy-McKee over the allegations but subsequently retracted that statement.

Davy-McKee officials declined to comment on the SPA charge.

The second company was not identified by SPA officials, who said such disclosure would impede its efforts to negotiate a settlement.

Several area microcomputer managers contacted about SPA activities said they believed the action would be received positively by the information systems community.

One manager commented that "upper management has no understanding of software and the licensing requirements and effectively encourages software copying." He also said that the size of the fines could serve to change management attitudes.

MICHAEL FITZGERALD

NEWS SHORTS

VDT legislation pared

San Francisco County dropped a requirement that VDTs be placed one meter away from adjoining workers in a compromise with businesses that said it would cost too much. The county's VDT legislation, supported by a majority of the county's supervisors, now leaves protection from electromagnetic radiation to a health panel. The legislation still has protections against repetitive stress injuries.

. . . .

AMS, Bell Atlantic go international

Bell Atlantic Corp. and American Management Systems, Inc. (AMS), a software and services vendor based in Arlington, Va., are eager to exploit the recent trend toward deregulation and privatization of foreign telecommunications monopolies. The firms jointly announced last week that Bell Atlantic will market AMS' Tieline software to local and long-distance telephone companies in selected countries. The software automates many of a telephone company's customer-oriented functions, including billing, collections and order management.

. . . .

Echelon eyes wiring scheme

A dozen manufacturers are expected this week to unveil household, office and factory products embedded with programmable silicon chips that communicate with each other over common electrical wiring. Bea Yormach, vice president of marketing at Palo Alto, Calif.-based Echelon Corp., said the companies — which she refused to identify — have used technology developed by Echelon. The chips are said to control access, lighting, climate and equipment use by linking motion sensors with a building's heating and ventilation, lighting and security systems.

. . . .

MCA sees 'opportunities'

MCA, Inc. Vice President of Information Systems George Brenner said last week's announced $6.6 billion friendly buyout of his entertainment firm by Japanese consumer products giant Matsushita Electric Industrial Co. presents some intriguing opportunities. "There are a lot of strategic things we can do in the areas of telecommunications, disaster recovery and technology sharing," Brenner said. "I'm sure we've done something they haven't, and they've done something we haven't; we could do a little swap."

. . . .

Judge lets outsourcing proceed

A Tennessee Chancery judge last week denied the Nashville Electric Service Employees' Association's request for an injunction to prevent Nashville Electric from outsourcing its IS function to a Memphis-based computer services firm [CW, Nov. 5]. The utility's board then voted to proceed with the seven-year outsourcing contract, which was slated to take effect this past weekend. Despite failing to get the injunction, the employees' association will proceed with its lawsuit against the utility, seeking damages for its affected members.

. . . .

Surgery for IS?

Centralized IS departments in many large companies are due for major reconstructive surgery, according to a study by Forrester Research, Inc. in Cambridge, Mass. The report said reorganizations have been fueled by outsourcing mainframe management functions and "downsourcing" application development to units closer to the business function. IS will take on a three-point structure, anchored by outsourcing providers, line IS groups and central IS, which take on monitoring and management roles, the study found.

. . . .

LAN management up for review

IBM and 3Com Corp. said last week they have made available for general review their specifications for a proposed Ethernet/Token-Ring network management standard. The companies had announced in July that they would work together on such a standard. Last week, the firms said that four companies have reviewed those preliminary specifications.

Object-oriented group sets standards outline

BY ROSEMARY HAMILTON
CW STAFF

FRAMINGHAM, Mass. — The Object Management Group (OMG) issued a report last week on the architecture it will promote as the industry standard for object-oriented systems.

Like other standards groups before it, the OMG expects it will take a few years before all the components of the architecture are selected and finalized.

It intends to forge ahead without official support from either IBM or Microsoft Corp. However, it has the support of nearly every other major company in the industry.

IBM in particular could pose a problem for the group, because it has announced its own big plans for object-oriented technology and expects to begin announcing products next year.

However, John Slitz, a spokesman for the group, said IBM had contributed to the creation of the Object Management Architecture Guide. An IBM spokesman could not confirm this, but he said he was aware that some IBM representatives had attended OMG meetings.

Building their own

Slitz said OMG members are building their own object-oriented systems that will be modified as the architecture's components are determined. The group will select only commercially available technology and will not accept academic proposals.

"We are obviously flying the plane while still building it," Slitz said. "But at least we are working at it. It's a better answer and more realistic" than starting from scratch, he added.

The OMG architecture consists of four major components to govern various aspects of an object-oriented system. Currently, the group has issued a request for technology for an Object Request Broker, which would manage the messaging between objects, and a request for information on its Objects Services component, which includes the data model.

The Object Request Broker is considered to be the core of the architecture in that it has the critical job of determining how messages are passed between objects.

Slitz said he expects requests for information to go out for the other two components — Common Facilities and Application Objects — in 1991.

Common Facilities are those items that can be shared by any application, such as a spelling checker. The Application Objects component will govern the building of applications through the use of object classes.

"To fill out this entire architecture, it will take us about 2½ years," Slitz said.

IBM

FROM PAGE 1

hardware, software and maintenance product lines.

Last week, observers said it appeared that the actual discounts will not improve much with revenue-based plans, but the significance of these deals is the flexibility they will provide to users.

Some observers also suggested the movement to revenue-based plans may have a hidden benefit for IBM. By putting more contracts on a revenue plan — particularly those that reportedly span hardware and software product lines — IBM has a more competitive weapon.

"My reading is they are giving large customers a little more incentive to do business with IBM, and therefore, it's harder for someone like [Storage Technology Corp.] to come in and cherry-pick a deal," said one IS manager who is negotiating a revenue-based contract.

Art Cohen, IBM director of product business practices, confirmed that IBM quietly shifted to a revenue-based plan for high-end mainframes earlier this fall. At the same time, the firm officially announced revenue-based discounting deals for Enterprise System/9000 air-cooled models.

Cohen said there is no official IBM enterprisewide agreement as described by the three IS executives. Any such agreement would fall under a special bid banner and would therefore be considered proprietary information.

However, two IS executives contacted last week said they are currently negotiating large-scale revenue-based deals that cover corporatewide purchases. In addition, Jack Cooper, president of CSX Technology, the IS division of CSX Corp., said he has been informed of enterprise agreements and added, "We are anticipating doing one."

Cooper said he believes IBM is trying to make contract negotiations easier for users. The enterprise agreement, he said, would allow him to add up all expenditures: "processors, software, maintenance, even some of your leasing and aggregate it to one number."

He said that with previous contracts, "everything was separate — disks, tape, processors — and it was done on a unit basis. So during the year, you had discounts on each type of unit. If you were a little short on one unit, you were compromised on maintaining that discount."

Big accounts have long been able to negotiate a variety of sweet deals under a cloak of secrecy known as the special bid. In some isolated cases, they may have been based on revenue commitments. But the recent shift for both water-cooled and air-cooled processors by IBM shows a determination to make this more far-reaching.

Jack Lewis, president of Amdahl Corp., said he believes IBM has done revenue-based deals "outside for years, particularly in Canada." While he said he was not familiar with widespread plans here, he added, "It wouldn't surprise me."

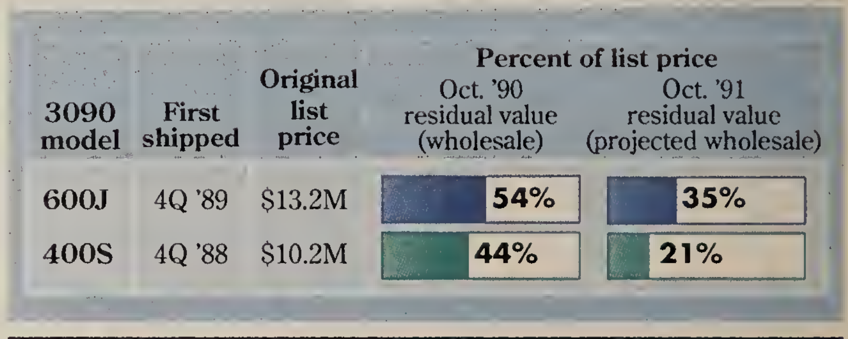
"I'm sure they are doing it in some places," Lewis said. "They'll just try to do whatever they can to optimize their competitive position."

Other users said they are either negotiating or evaluating the various revenue-based plans. One senior IS vice president, who requested anonymity, said he is negotiating a revenue-based enterprise agreement "that includes hardware purchases, software, maintenance, PCs [and] education."

The IS executive said he is required to project that for a one- or two-year period, total IBM purchases will increase by 10% annually. "They take that amount, stir up their secret formula and come back with a proposed discount across the whole amount," he said.

Out with the old

Residual values of IBM 3090 mainframes are projected to fall dramatically as IBM's ES/9000 series comes on-line



3090 model	First shipped	Original list price	Percent of list price: Oct. '90 residual value (wholesale)	Percent of list price: Oct. '91 residual value (projected wholesale)
600J	4Q '89	$13.2M	54%	35%
400S	4Q '88	$10.2M	44%	21%

Source: Computer Economics, Inc.

CW Chart: Paul Mock

Ex-IBM exec dead at 62

Burton S. Goldberg, 62, a former head of IBM's Large Systems Division and a developer of the IBM System 360 and System 370, died of a heart attack last week.

Goldberg retired in 1984 after three decades at IBM. Pointing to his ongoing involvement in various ventures, colleagues said Goldberg was still in his prime as an industry executive.

He was a member of the boards of 3Com Corp., LAN Systems, Inc. and Software Publishing Corp. and an adviser on venture capital deals through affiliations with The Mayfield Fund and New Enterprise Associates.

"Burt had at least half a dozen projects going," said Belden Menkus, editor of "EDPACS," a computer security newsletter. "His wife recently told me that they were thinking of giving up their apartment and moving back to a house just to make room for all of his ventures."

Along with former IBM Treasurer David Finley, Goldberg was in the process of launching his own company, Technology Builders International, a consulting firm aimed at bolstering young or underachieving technology firms.

"Burt had a child's curiosity for how to apply technology to markets of opportunity," said 3Com Chairman and co-founder William Krause. "In this way could an Easterner leave his mark on Silicon Valley."

In addition to spearheading major systems architectures at IBM, "Burt was one of the first people to understand the enormous significance of distributed processing," said consultant and former IBM colleague Sam Albert. The IBM 8100, an early attempt at distributed processing, was Goldberg's creation, Albert said. At the time of his retirement, Goldberg headed IBM's personal computer operations in Europe.

Goldberg is survived by his wife and two children.

IBM readies update on Officevision progress

IBM plans to go public with a progress report on Officevision Release 2 in two weeks, a company spokesman said last week.

The clock is ticking away on the company's shipment deadlines for Release 2. It had promised to have two Release 2 versions out in the fourth quarter and to announce an availability date for the Application System/400 version in this time frame.

However, in an October interview, Tony Mondello, vice president for office systems development, said it was possible that IBM could slide by a few weeks in delivering both the local-area network and mainframe VM versions. At that time, he could not promise if IBM would be ready to announce by year's end an availability date for the AS/400 version. The MVS version has long had a 1991 delivery date.

Last week, a spokesman said IBM "is looking to having additional details on our plans available by mid-December."

He said Mondello's group is currently reviewing OS/2 Version 1.3. However, the Release 2 version of Officevision for the Personal System/2 was intended to work with OS/2 Version 1.2. The spokesman said the newest version of the operating system will "not necessarily" override OS/2 1.2 because Officevision is "scheduled and announced to run on [Version] 1.2."

IBM COULD slide by a few weeks in delivering both the local-area network and mainframe VM versions.

ROSEMARY HAMILTON

Unisys takes commercial tack

Firm's defense systems unit announces plans for satellite-based service

BY ELLIS BOOKER
CW STAFF

MCLEAN, Va. — Apparently seeking to tilt its defense systems unit toward the commercial market, Unisys Corp.'s Space Systems Division last week announced plans to build a commercial, satellite-based service for geolocational, messaging and remote equipment monitoring services.

Expected to be operational in the middle of the decade, the project is believed to be the first commercial venture for Unisys' defense systems unit and could generate revenue in excess of $250 million over 10 years, Unisys said.

However, analysts observed that the planned Satellite Tracking Radiolocation and Communications system, or Sat/Trak, will face an uphill fight against the half-dozen or so existing and planned providers of satellite-based geolocation and messaging services for fleets of trucks, ships and other vehicles.

"It doesn't bring anything to the market," said John Pemberton, program director for communications at Gartner Group, Inc. in Stamford, Conn. Gartner Group predicted that the $370 million market for mobile satellite services will grow to $600 million in 1991 and $6.2 billion by 1995. Gartner Group believes wireless communications will be the fastest growing segment of the communications market during the next five years and will represent $35 billion of a worldwide $385 billion market in 1995.

Pemberton said a number of defense and aerospace companies are moving into the wireless communications business, especially satellite-based systems, where, he said, they have an affinity and technological prowess. While precise geopositioning is most urgently needed for intercontinental air traffic, the use of the technology for "remote monitoring of equipment is tremendous," Pemberton said.

However, Pemberton questioned the project's choice of untried technology — the 20- to 30-GHz Ka satellite band for end-user applications. Existing services, including the Global Positioning System now being used by U.S. military forces in the Persian Gulf, use the lower 1- to 2-GHz L satellite band and are less susceptible to interference from adverse weather conditions, according to Pemberton.

But A. J. Seastone, vice president of Energetic Satellite Corp., Unisys' Denver-based partner and the satellite designer for the project, said the service will be superior to the competition because it will not require either expensive transceivers on the vehicle or expensive satellites in the sky.

"Our transceivers only send and receive signals, as do our satellites," he said. "All the processing, location determination and messaging is done at the ground center."

For this reason, he estimated, the transceivers for Sat/Trak will cost only $250 to $350, rather than the $3,000 to $5,000 users must now spend for such equipment. This low price, he said, could open up the market for end-user satellite services.

Unisys' Space Systems Division, a provider of software and services to the National Aeronautics and Space Administration, has responsibility for Sat/Trak and will develop and operate the service's ground station and ground processing system. Unisys will also provide software, hardware and parallel processors for the ground station, to be located in Salt Lake City.

Energetics Satellite Corp. is Unisys' partner in the exclusive venture and will design the satellites, which will be built by Intraspace Corp. in Salt Lake City.

Stratus turns to networking initiatives

BY JOANIE M. WEXLER
CW STAFF

MARLBORO, Mass. — Users cannot live by fault tolerance alone, Stratus Computer, Inc. acknowledged last week. The firm announced networking initiatives aimed at facilitating application interoperability between its XA2000 Continuous Processing System and other computing and network platforms.

A new piece of software, OSI Server, due out early next year, is said to allow Open Systems Interconnect (OSI) applications to be developed for Stratus' proprietary VOS operating system. OSI Server for FTX — Stratus' Unix System V-based operating system slated to ship by month's end — will be available sometime in 1991, the company said.

Not too important

One XA2000 user, David Marshall, manager of systems development for marketing applications at Intercontinental Hotels Corp., said the OSI announcement "is not terribly important" for his company today. "But in two to three years, the world is going to be a different place," he said. "It's good to stick with a vendor developing products for the full OSI stack."

Rick Villars, an analyst at International Data Corp. in Framingham, Mass., said that some research conducted by his company indicates solid plans by several Fortune 100 companies to move to OSI backbones within the next three to five years.

"If that reflects an industry trend, it will be vital for companies running on-line transaction processing applications to have a platform in place for migrating to OSI," he said.

Stratus' main targets for OSI Server are companies in Europe, telecommunications service providers and other large North American companies that resell telecommunications service. OSI Server's first appeal will be for fault-tolerant electronic mail backbones, the firm said.

The company also announced last week that it will distribute, support and enhance Network Express, software that pulls dissimilar computing platforms into a single on-line transaction processing environment. Stratus would not comment on when Network Express might be available for FTX.

Network Express prevents applications running on an XA2000 from having to be rewritten in order to communicate with other protocols. It was designed and marketed for Stratus by Scientific Software, Inc.

Network Express will reportedly gain support for Transmission Control Protocol/Internet Protocol and IBM's Netbios. Protocols already supported include X.25 and IBM Systems Network Architecture.

Second-class postage paid at Framingham, Mass., and additional mailing offices.
Computerworld (ISSN 0010-4841) is published weekly, with a single combined issue for the last week in December and the first week in January by CW Publishing/Inc., 375 Cochituate Road, Box 9171, Framingham, Mass. 01701-9171.

Copyright 1988 by CW Publishing/Inc. All rights reserved.

Computerworld can be purchased on 35 mm microfilm through University Microfilm Int. Periodical Entry Dept., 300 Zeeb Road, Ann Arbor, Mich. 48106. *Computerworld* is indexed: back issues, if available, may be purchased at $2.00 per issue, plus postage. Call (800) 669-1002.
Photocopy rights: permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by CW Publishing/Inc. for libraries and other users registered with the Copyright Clearance Center (CCC), provided that the base fee of $3.00 per copy of the article, plus $.50 per page is paid directly to Copyright Clearance Center, 27 Congress Street, Salem, MA 01970, 508-744-3350.
Reprints (minimum 500 copies) and permission to reprint may be purchased from Sharon Bryant, CW Publishing/Inc., 375 Cochituate Road, Box 9171, Framingham, Mass. 01701-9171. For Back issues contact Margaret McIndoe.
Requests for missing issues will be honored only if received within 60 days of issue date.
Subscription rates: $2.00 a copy: U.S. — $48 a year; Canada — $110 a year; Central & So. America — $130 (surface), $250.00 (airmail) a year; Europe — $195 a year; all other countries — $295 a year. Four weeks notice is required for change of address. Allow six weeks for new subscription service to begin. Subscriptions call toll free (800) 669-1002.
POSTMASTER: Send Form 3579 (Change of Address) to *Computerworld*, P.O. Box 2044, Marion, OH 43305.

TRENDS

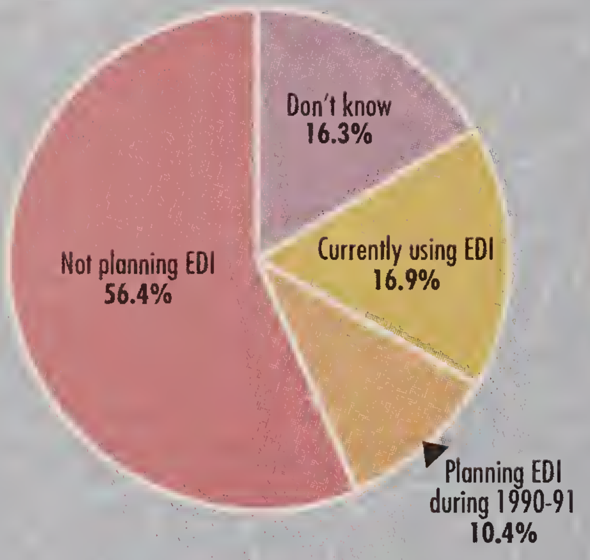
Electronic Data Interchange

With the technology eliciting a lukewarm response at best, external pressure from customers is one of the driving forces behind electronic data interchange (EDI)

Not a priority

An overwhelming 56% have no intentions of implementing EDI within the next few years

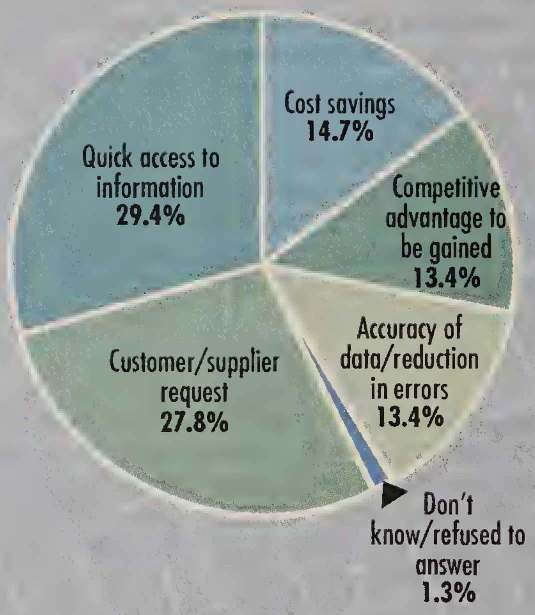
Respondent base: 847
(percent of respondents)



Reasons for using EDI

Motivations for EDI stem from a variety of places with information access and customer/supplier requests being the top two

Respondent base: 231
(percent of respondents)



Top five barriers to EDI

Lack of trading partners with which to do EDI is mentioned as the main hindrance for implementation

Respondent base: 120 (percent of respondents)

Trading partners will not participate	21.4%
Compatibility of hardware/software	20.8%
Cost of implementation	14.3%
Lack of EDI education and training	13.6%
Lack of knowledge about EDI	8.4%

Source: EDI Research, Inc., Oak Park, Ill.

CW Chart: Marie Haines

NEXT WEEK

Two very different things lured **Ken Graham** out of retirement at the age of 59: the romance of the wine-making industry and the introduction of the IBM Application System/400. Learn more about Robert Mondavi Winery's director of MIS and the use of systems in the genteel but competitive wine business in a Manager's Journal profile.

Andy Freeberg

What DOS shell excels at file management but is hard for beginners to get their hands around? Answer: Xtree Co.'s Xtree Pro Gold. See what the experts have to say and how they rate the product in Technology Analysis, a comprehensive summary of opinions from personal computer laboratories, publications, users and analysts.

INSIDE LINES

Underground stirrings

Computerworld received a call last week from an anonymous source who warned us that Kryptik, an underground hacker group, intended to plant a virus in a telephone network this Wednesday. A second source described the group as a "bunch of real nasty kids" and added, "If anybody could do it, they could." Still another source claimed the group was preparing to carry out its mischief around Christmas to coincide with a hacker's convention slated for Houston. The group is apparently bent on revenge for the recent sentencing of three hackers, who were given 14- to 21-month jail terms and fined stiff restitution payments for breaking into Bellsouth computers. A similar threat, which was not carried out, was made days before the Nov. 15 sentencing.

Finger painting

Bill Gates wants to have information at his fingertips — and talk to his machine, too. Accordingly, Microsoft is expected to announce this week that it has increased its holdings in Natural Language, Inc. in Berkeley, Calif., a 60-person software firm specializing in English-language user interfaces. Microsoft only spent $1 million this time, which is said to increase its share of Natural Language stock to more than 10%.

Virus? What — me, worry?

It must be a sign of the times. *MAD* magazine's Computer Virus Edition just hit the newsstands. The summer 1991 special edition features 96 pages of "glitches," including a "bug-infested Alfred E. Neuman program." Wanna-be *MAD* hackers are urged to waste time, energy and money copying programs that will create a *MAD* logo and Neuman's face.

More MIPS from Mips

The next RISC processor from Mips Computer Systems should be in the hands of systems companies by next month and in products by late summer 1991. The processor, seen as late to the dinner table by analysts, should rival the speed of Sun's latest RISC processor, at 40 MHz and about 29 MIPS.

Here we go again

The never-ending Wang rumor mill is now buzzing with word of big doings sometime next month. While nothing has been confirmed, analysts are speculating that the Lowell, Mass.-based minicomputer and imaging vendor is shopping around for financing and may be considering some type of limited partnership or distribution deal with Hitachi Data Systems.

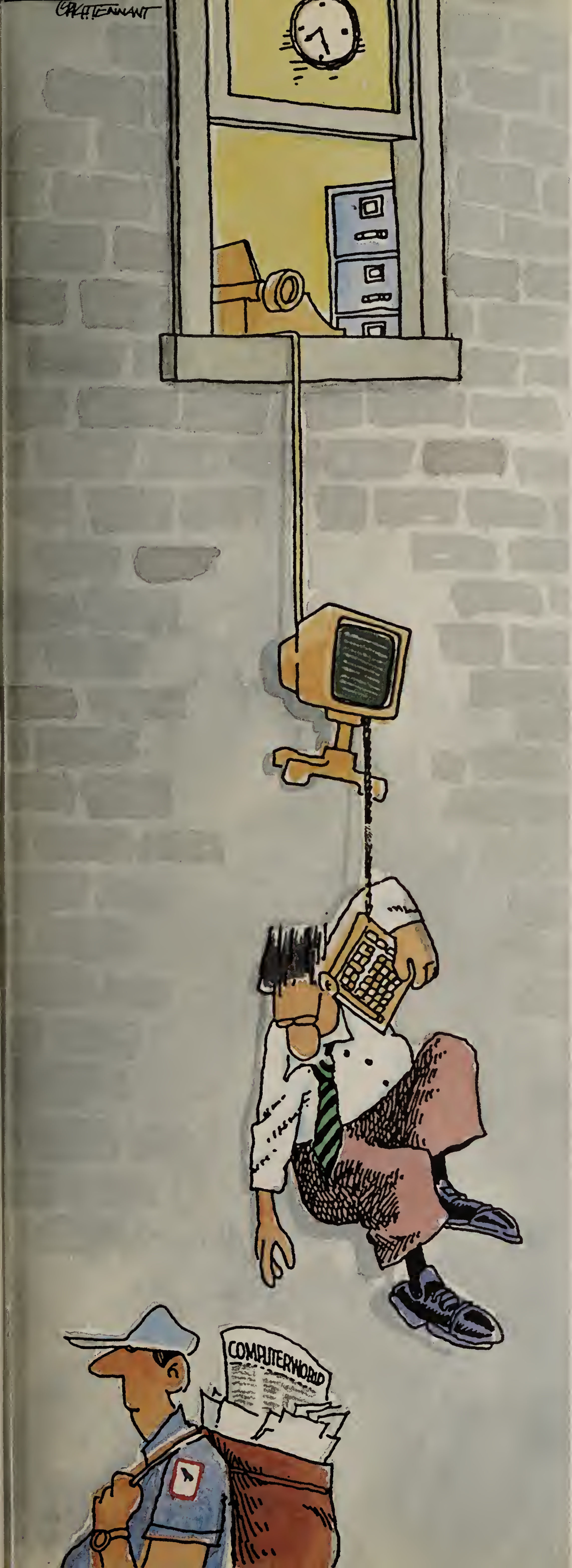
Killer technology

The upcoming high-end Apple Macintosh based on the Motorola 68040 chip is reportedly hooked up to such a large monitor in the company's labs that Apple engineers have christened it with a suitably imposing nickname: Megadeath. The machine is scheduled to arrive in the first half of next year.

Did you say you had a problem?

For Oracle customers who haven't complained enough already, there will be a new customer support service to track users' problems that involve billing, ordering and other non-product issues. The new service, which may be announced as early as this week, is an addition to Real-Time Support, Oracle's revamped call-in customer service line. "This new organization will take responsibility for all nontechnical issues," Mike Fields, president of the Oracle USA Sales Division, told *Computerworld* last week.

In a prophetic slip of the tongue, Merrill Lynch IS boss Du Wayne Peterson began his keynote speech at the CIO/AMR conference in late October by mistakenly referring to a Wall Street Journal *story on Merrill Lynch as a chronicle of "the current changes going on at Security Pacific" — where he was IS head five years ago. Later, Security Pacific CEO Michael S. Heschel began his remarks by joking, "When I heard what Du Wayne said, I almost rushed to call my office to see what was going on." Heschel gave up that office last month (see story page 1). Stirrings in the top ranks are always of high interest, so tip off News Editor Pete Bartolik at (800) 343-6474, message* COMPUTERWORLD *on MCI Mail, or fax the info to (508) 875-8931.*



There's no end to how far people will go to get COMPUTERWORLD first.

Do you risk life and limb each week to be one of the first in your company to nab the office copy of *Computerworld*?

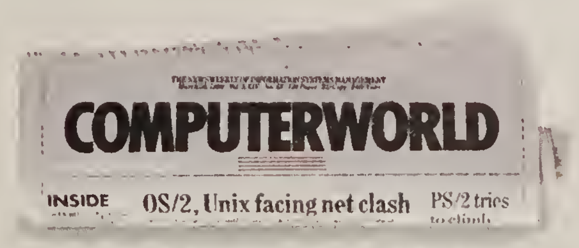
Well now there's a better-and safer-way to get the latest, most up-to-date news in the information industry, hot off the presses.

Subscribe to *Computerworld* and receive 51 issues of the best-read publication in the information industry. Plus, you'll get our special bonus publication, *The Premier 100*, an annual profile of the top companies using information systems technology.

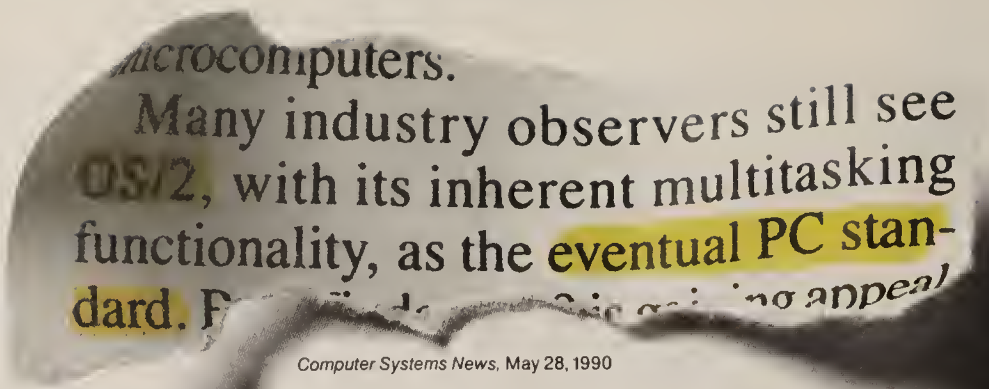
There's no need to wait days before your company or department subscription reaches your desk. And there's no need to go to extremes just to be among the first in your company to read about the products and people, trends and technology, issues and information that shake the IS community each week.

Just use the postage-paid subscription card bound into this issue. And get your own copy of *Computerworld*.

Why take chances?



The Newsweekly of Information
Systems Management

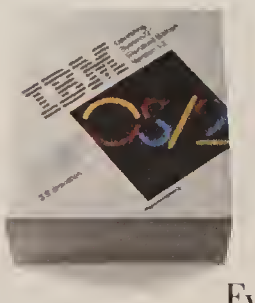

icrocomputers.

Many industry observers still see OS/2, with its inherent multitasking functionality, as the eventual PC standard. F [illegible] ing appeal

Computer Systems News, May 28, 1990

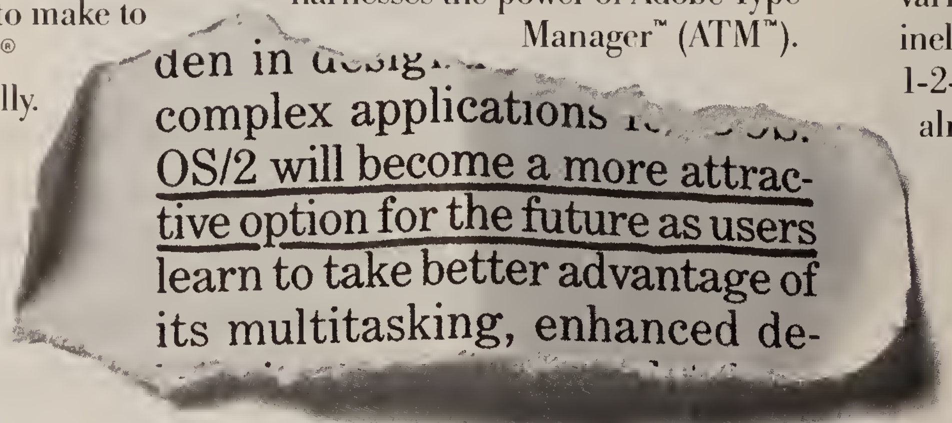
"Eventually" is here.

ANNOUNCING THE OS/2 YOU'VE BEEN WAITING FOR.



For quite some time, the press has been writing about the move everyone will want to make to OS/2.® Eventually.

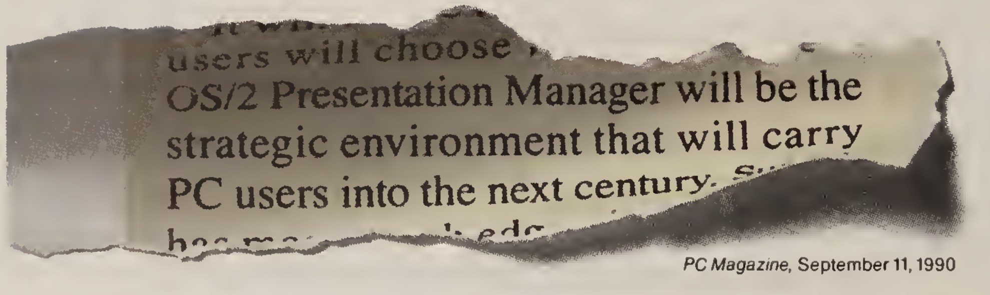
Well, all at once OS/2 1.3 has made OS/2 the operating system it was meant to be—the one you'll want to move to right here and now.


den in desig [illegible] complex applications [illegible] OS/2 will become a more attractive option for the future as users learn to take better advantage of its multitasking, enhanced de-

PC Week, August 13, 1990

OS/2 LOSES A LITTLE WEIGHT.

For starters, OS/2 has lost some of its appetite for memory. In fact, now you can make the move to OS/2 1.3 with as little as two megabytes on your system. What's more, this streamlined version leaves more room for applications and will offer some users a substantial performance increase in many system functions.


users will choose [illegible] OS/2 Presentation Manager will be the strategic environment that will carry PC users into the next century.

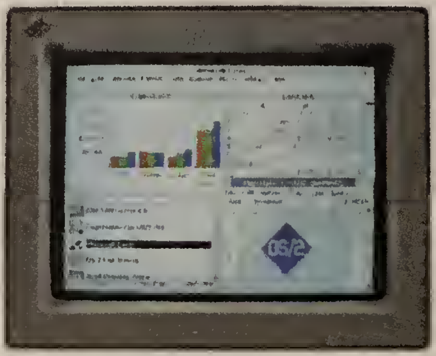
PC Magazine, September 11, 1990

FUNCTIONALITY. FUNCTIONALITY. AND DID WE MENTION FUNCTIONALITY?

Multitasking. Seamless connectivity. The ability to run applications larger than 640K. DOS compatibility. All these features have made OS/2 appealing in the past, but new features have catapulted OS/2 into the here and now.

For instance, now OS/2 1.3 harnesses the power of Adobe Type Manager™ (ATM™). With this new feature, the quality of screen fonts has improved dramatically, giving you a true WYSIWYG capability so what you see is indeed what you get. ATM also gives OS/2 more flexibility in document creation by supporting a wide range of outline fonts.

Of course, what good is all this without printer support? Not much. So OS/2 1.3 has improved and expanded its printer support to include drivers for almost all popular printers.

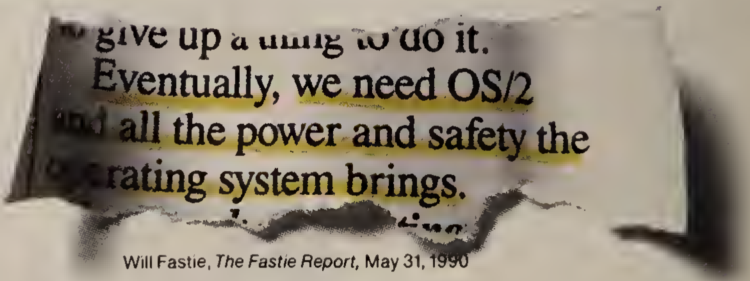


BUSINESS IS BOOMING.

Now that OS/2 is moving forward, so are software developers. Every day, more and more applications are joining the growing pool of available OS/2 software. In fact, a variety of major business programs, including Aldus® PageMaker,® Lotus® 1-2-3/G® and Microsoft® Excel, have already made the transition to OS/2.

These, along with many others, have been redesigned to go beyond DOS memory limits and take advantage of OS/2's intuitive graphical interface—Presentation Manager.™

It's been said that eventually you'll want to take advantage of everything OS/2 has to offer. Well, wait no more because "eventually" is here.


give up a thing to do it. Eventually, we need OS/2 and all the power and safety the rating system brings.

Will Fastie, The Fastie Report, May 31, 1990

For more information on what OS/2 can do for you here and now, or to get details on a no-charge upgrade to Version 1.3, contact your IBM Authorized Remarketer or marketing representative.

OS/2 can do!

IBM

IBM and OS/2 are registered trademarks and Presentation Manager is a trademark of International Business Machines Corporation. Microsoft, a registered trademark of Microsoft Corp. Adobe Type Manager and ATM, trademarks of Adobe Systems, Inc. Aldus and Pagemaker, registered trademarks of Aldus Corp. Lotus and 1-2-3/G, registered trademarks of Lotus Development Corp. ©1990 IBM Corp.